

Figure 2-30 Planned Route of Distribution Main, Madina Town No. 2 DZ (2)

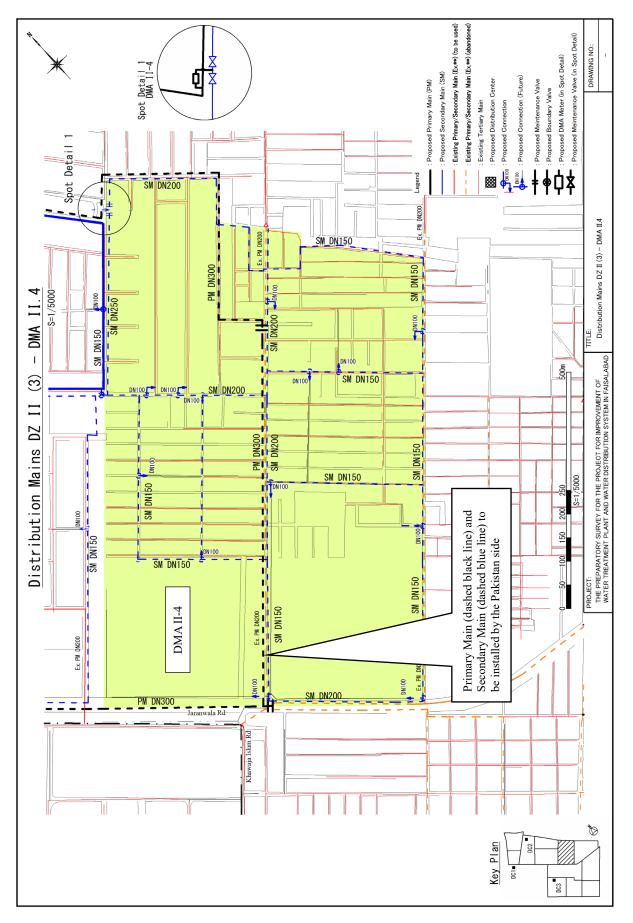


Figure 2-31 Planned Route of Distribution Main, Madina Town No. 2 DZ (3)

2-2-2-7 Electrical Equipment and Instrumentation

(1) Substation Facilities

In order to supply electric power to the WTP and distribution centers for the Project, substation facilities shall be installed to branch off 11,000 V from the distribution line and reduce the voltage to 400 V by a transformer equipment.

The Old JK WTP constitutes a substation facility that receives 11,000 V of electric power supply in the electricity meter house and steps down with transformer equipment in the nearby power receiving and transforming, and generator house.

Each DC installs transformers on a utility pole outside the plant premise constituted by receiving and transforming facility, and receives low voltage of 400 V within the plant premises.

1) Construction Plan of Substation Facilities for the Old JK WTP

The substation facilities of the Old JK WTP shall be constructed in consideration of appropriate future expansion. This is because the following problems may arise if the facilities are prepared separately at this time and in the future.

- Two substation facilities are required. In that case, an interlock system as a safety mechanism is required at the secondary side circuit breaker of each transformer. If WASA-F's operators operate the circuit breaker incorrectly by mistake or lack of knowledge, there is concern on the occurrence of electrical accidents, which is undesirable in terms of operation management.
- Two generators are also required. In that case, it is necessary to synchronize the electrical properties such as voltage and frequency of the two generators. If WASA-F's operators turn on the power without synchronization due to mistake or lack of knowledge, there is also concern on the occurrence of electrical accidents.
- At the time of expansion construction work in the future, it is necessary to rebuild the power receiving and metering panel room, the power receiving/transforming/private power generation room, and the power generation facility that were constructed/installed during this work. At that time, electricity will not be available for about two weeks, and the operation of the water treatment plant will stop. In addition, equipment that will be used for only a few years will be discarded. As a result, it is expected that the cost for electrical works is more than double.

2) Classification of Contracts with Power Supply Company

In this Project, the category for the contract of electric power supply shall be categorized as "A-3" under the provision of Faisalabad Electric Supply Company (FESCO).

In this category, monthly electricity rates are determined by the amount of electricity used in the respective month, and other costs such as taxes and fuel adjustment costs are added. Fixed basic charges, which depend on the capacity of the facility, are not applicable.

Electricity rates for the Old JK WTP are determined primarily by the amount of electricity used, regardless of the capacity of the transformer to be installed. In other words, there is not much difference in electricity rates between the capacity of the transformer for the current power load and that

of the expected future power load.

3) Classification of Construction with WASA-F

In the discussion with FESCO, it was confirmed that WASA-F would calculate the demand on electric power (kW) of each facility and that FESCO would carry out the designing and construction of the receiving and transforming facilities based on the calculation.

In addition, it was also confirmed that it would be possible to install the substation facilities with the capacity required in the future expansion if the design of the power receiving and transforming equipment includes the future expansion,

4) Responsibility among the Parties Involved

As mentioned in 1), 2) and 3), the substation facilities of the Old JK WTP are planned to be constructed including the future expansion portion.

As for the demarcation of construction works, WASA-F is responsible for the electrical work including equipment from overhead distribution lines in urban areas to the transformer at the site. On the other hand, the Japanese contractor is responsible for the construction of the electricity meter house, power receiving and transforming, and generator house.

The outline of the substation facilities is summarized in Table 2-42.

Wouls Itom		Facility	
Work Item	Old JK WTP	Abudulah Pur DC	Madina Town No.2 DC
	Off-Site	Off-Site	Off-Site
Cable Work	(cost borne by Pakistani side)	(cost borne by Pakistani side)	(cost borne by Pakistani side)
	On-Site	On-Site	On-Site
	(cost borne by Pakistani side)	(cost borne by Pakistani side)	(cost borne by Pakistani side)
	Power Meter Panel*,		
	Electricity Meter House	-	-
	(cost borne by Japanese contractor)		
High-Voltage	High-Voltage Switch Panel*,		
Panel	Power Receiving and		
	Transforming, and Generator	-	-
	House		
	(cost borne by Japanese contractor)		
Protective	Relay Panel*,	Fuse*,	Fuse*,
Equipment	Electricity Meter House	Mounted Pole Type	Mounted Pole Type
Equipment	(cost borne by Japanese contractor)	(cost borne by Pakistani side)	(cost borne by Pakistani side)
	1,250 kVA*,		
	Power Receiving and	200 kVA*	400 kVA*
Transformer	Transforming, and Generator	Mounted Pole Type	Mounted Pole Type
	House	(cost borne by Pakistani side)	(cost borne by Pakistani side)
	(cost borne by Japanese contractor)		
	Low-Voltage Distribution	Low-Voltage Receiving	Low-Voltage Receiving
Low-Voltage	Panel*,	Panel,	Panel,
Panel	Power Receiving and	Electric Room	Electric Room
	Transforming, and Generator	(cost borne by Japanese	(cost borne by Japanese

Table 2-42 Outline of Substation Facilities

Weels Item		Facility		
work item	Work Item Old JK WTP Abudulah Pur DC		Madina Town No.2 DC	
	House	contractor)	contractor)	
	(cost borne by Japanese contractor)			
Inspection	Equipment and Cables	Equipment and Cables	Equipment and Cables	
and Testing	(cost borne by Japanese contractor)	(cost borne by Japanese	(cost borne by Japanese	
and resting	(cost borne by Japanese contractor)	contractor)	contractor)	

Note: The cost for the items marked with * is borne by the Japanese contractor. However, the design, procurement, and installation of the equipment require approval of FESCO. In addition, the certified equipment by FESCO shall be installed by authorized companies by FESCO.

(2) Generators

Power outages occur in Faisalabad, about four hours per month around the Old JK WTP and seven hours per week around the distribution centers. Diesel generator is planned to be installed for continuous service of water supply during power failures. The capacity of the generator is selected based on the requirement of operating the entire facilities of the WTP and distribution centers (such as intake, settling, chemical dosing, sand filter, transmission pump, lift pump) for 48 hours.

Capacity of the generator for the Old JK WTP shall be the capacity including the future expansion from the viewpoints of the complexity of the system configuration, safety, and operational management as explained in "(1) Substation Facilities, 1) Construction Plan of Substation Facilities for the Old JK WTP".

The outline of the generators is summarized in Table 2-43.

Facility Name		Specification			
	Туре	Generator Capacity	Accompanying Equipment		
		3-phase 4-wire Type	Outdoor Fuel Tank		
Old JK WTP	Indoor Cubicle Type	400/230 V	10,000 L (over 48 hr		
		1,000 kVA	operable)		
Abudulah Pur		3-phase 4-wire Type	Outdoor Fuel Tank		
	Outdoor Cubicle Type	400/230 V	3,500 L (over 48 hr		
DC		300 kVA	operable)		
Madina Town No.2		3-phase 4-wire Type	Outdoor Fuel Tank		
	Outdoor Cubicle Type	400/230 V	4,000 L (over 48 hr		
DC		300 kVA	operable)		

Table 2-43 Outline of Generators

(3) Power Equipment

Low-voltage switchboards and power control boards shall be provided to operate the main components of the water treatment and distribution facilities. The outline of each board is listed in Table 2-44 \sim Table 2-46.

Board Name	Specification		
board Name	Model	Quantity	Rating
Low-Voltage Power Board	Construction Indoor, Standalone Steel Plate,	1	3-phase 3-wire 400 V 2,000 A

Table 2-44 Outline of Power Equipment for the Old JK WTP

D 11	Specification			
Board Name	Model	Quantity	Rating	
	Dustproof			
Power Distribution Board	Construction Indoor, Standalone Steel Plate, Dustproof	2	3-phase 3-wire 400 V 630 A	
Raw Water Transmission Pump Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	4	3-phase 3-wire 400V 30 kW×2, 45 kW×1	
Settling Tank No. 1, 2 Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	2	3-phase 3-wire 400 V	
Rapid Sand Filter Distribution Board	Construction Indoor, Standalone Steel Plate, Dustproof	1	3-phase 3-wire 400 V	
Rapid Sand Filter Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	2	3-phase 3-wire 400 V	
Waste Water Tank and Sludge Tank Distribution Board	Construction Indoor, Standalone Steel Plate, Dustproof	1	3-phase 3-wire 400 V	
Waste Water Tank and Sludge Tank Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	2	3-phase 3-wire 400 V	
Pump Equipment Distribution Board	Construction Indoor, Standalone Steel Plate, Dustproof	1	3-phase 3-wire 400 V	
Backwashing Pump Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	3	3-phase 3-wire 400 V	
Transmission Pump Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	3	3-phase 3-wire 400 V 90 kW×2, 110 kW×1	
Chemical Dosing Unit Distribution Board	Construction Indoor, Standalone Steel Plate, Dustproof	1	3-phase 3-wire 400 V	
Aluminum Sulfate Dosing Unit Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	1	3-phase 3-wire 400 V	
Polymer Coagulation Aid Dosing Unit Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	1	3-phase 3-wire 400 V	
Chlorine Dosing Facility	Construction Indoor, Standalone	1	3-phase 3-wire 400 V	

Board Name	Specification		
Doard Name	Model	Quantity	Rating
Distribution Board Steel Plate,			
	Dustproof		
Chlorine Dosing Facility Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	1	3-phase 3-wire 400 V

Table 2-45 Outline of Power Equipment for Abudulah Pur DC

Board Name		Sp	Specification		
Doard Name	Model	odel Quantity Rating			
Distribution Board	Construction Indoor, Standalone Steel Plate, Dustproof	1	3-phase 3-wire 400 V 400 A		
Pumping Facility Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	4	3-phase 3-wire 400 V 30 kW×4		
Distribution Center Motor Control Board	Construction Indoor, Standalone Steel Plate, Dustproof	1	3-phase 3-wire 400 V		

Table 2-46 Outline of Power Equipment for Madina Town No. 2 DC

Board Name		Sp	Specification		
Doard Name	Model	Quantity	antity Rating		
	Construction Indoor,				
Distribution Board	Standalone	1	3-phase 3-wire 400 V 400 A		
Distribution Board	Steel Plate,	1	5-phase 5-wile 400 V 400 A		
	Dustproof				
	Construction Indoor,				
Pumping Facility	Standalone	4	3-phase 3-wire 400 V 55 kW×4		
Motor Control Board	Steel Plate,	4	3-phase 3-wire 400 v 55 kw ~4		
	Dustproof				
	Construction Indoor,				
Distribution Center	Standalone	1	3-phase 3-wire 400 V		
Motor Control Board	Steel Plate,	1	3-phase 3-wile 400 v		
	Dustproof				

(4) Monitoring and Control Equipment

1) Communication Infrastructure System

Since the transmission pumps at the Old JK WTP need to be controlled according to the water level, inflow rate and inflow pressure at the inlet of the GR in each DC, a remote supervisory system using a conventional type SCADA is planned to be installed in the WTP. In this remote supervisory system, water level, flow rate, and water pressure data from the measuring instruments installed in the distribution centers and DMAs are transmitted to the WTP and are monitored on displays. The SCADA also enables data management of operating status including abnormal status of the distribution centers, and flow rate of district meters.

On the other hand, remote control function has concerns due to the fact that unstable local electric power conditions and poor communication infrastructure will interfere with the transmission and reception of signals among the WTP, distribution centers, and DMAs. Considering that situation, remote control should not be applied because that control may cause unexpected malfunctions to the facilities.

Based on the results of confirmation with local communication companies, the internet communication is applied for the section between the WTP and distribution centers. For the section between the WTP and DMAs, the wireless mobile phone network is applied. Table 2-47 shows the comparison of these systems It needs to be discussed with telecom companies about routes and connection manners at the detailed design stage.

Item	Internet Communication	Wireless Mobile Phone Network	
	This is a method of exchanging data using	This is a method of exchanging data using	
	public internet communications. The amount	wireless mobile phone network. The	
	of data that can be transmitted is larger than	amount of data that can be transmitted is	
Overview	that of a wireless mobile phone network. The	small. There is a possibility that the	
Overview	communication speed is also more stable.	communication speed becomes unstable	
	Internet communication infrastructure is not	depending on the usage in the vicinity.	
	very fast but at a certain level in Faisalabad.	Several telecommunication companies are	
		available in Faisalabad.	
Cost	High	Low	
Transmission	Laura	Small	
Capacity	Large	Sman	
	Stable communication speed is required for	The required data is only flow rate and	
	the section between the WTP and distribution	pressure for the section between the WTP	
	centers since the data quantity is large.	and DMAs. Also, real-time data	
Discussion	Therefore, the internet communication is	transmitting by a high-speed system is not	
	applied in the section.	necessary. Therefore, the wireless	
		mobile phone network is applied in the	
		section.	

 Table 2-47
 Comparison of Communication Infrastructure System

2) Outline of Monitoring and Control Equipment

To monitor and control the major equipment of the WTP and the distribution centers, the following equipment shall be provided. The outline of each unit is summarized in Table 2-48.

Facility Name	System Configuration	Quantity
Old JK WTP	Operator Station	2
Monitoring and Control	A4 Color Laser Printer	1
Equipment	A3 Monochrome Printer	1
	Telemeter Panel	1
	Large Display 60"	1

Table 2-48Outline of Monitoring and Control Equipment

Facility Name	System Configuration	Quantity
Central Monitoring Room	PLC (Duplexing) (OJK WTP)	1
_	PLC (Duplexing) (Off-Site)	1
	Router	1
	PTZ Camera	2
	CCTV Server	1
	UPS (10-minute Rating)	1
Raw Water Transmission	Instrumentation panel (Built-In RI/O)	1
Facility	Touch Panel	1
Transmission Facility	UPS (10-minute Rating)	1
Chemical Dosing Facility	Instrumentation panel (Built-In RI/O)	1
	Touch Panel	1
	UPS (10-minute Rating)	1
Rapid Filtration Facilities	Instrumentation panel (Built-In RI/O)	1
Sodium Hypochlorite Dosing	Touch Panel	1
Facility	UPS (10-minute Rating)	1
Sludge Treatment Facilities	× <i>3</i>	
Abudulah Pur	Local Station Panel	
DC	(RI/O Unit, Touch Panel, Router, UPS:30-minute	1
DC	Rating)	
Madina Town No.2	Local Station Panel	
DC	(RI/O Unit, Touch Panel, Router, UPS:30-minute	1
DC	Rating)	
DMA Zone	Local Station Panel	1
1-1, 1-2	(GSM Modem, UPSs: 30-minute Rating)	(add 1 in
1-1, 1-2	(OSM Modelli, Or SS. 30-minute Rating)	future)
DMA Zone	Local Station Panel	1
2-1~2-4	(GSM Modem, UPSs: 30-minute Rating)	(add 3 in
	(OSM Woden, OI 55. 50-minute Rating)	future)

(5) Instrumentation

The main instrumentations of the WTP and distribution centers are summarized in Table 2-49.

Name	Installation site	Purpose of Installation	Туре	Quantity
Old JK WTP				
Level Meter	Intake Well	Screen Start/Stop	Ultrasonic Type	2
Level Meter	Raw Water Transmission Pump Well	Transmission Pump Start/Stop	Ultrasonic Type	1
Flow Meter	Transmission Pipe	Transmission Flow Measurement	Electromagnetic φ400	1
Turbid Meter	Receiving Well	Turbidity Measurement	Immersion Type	1
pH Meter	Receiving Well	pH Measurement	Immersion Type	1
Level Switch	Rapid Sand Filter Inlet	Water Level Detection	Electrode Type	1
Level Meter	Rapid Sand Filter Inlet	Water Level Measurement	Ultrasonic Type	4
Flow Meter	Rapid Sand Filter Outlet	Treated Water Flow Measurement	Electromagnetic Type	1
Turbid Meter	Rapid Sand Filter Outlet	Treated Water Turbidity Measurement	Immersion Type	1
Residual Chlorine Meter	Clear Water Reservoir	Residual Chlorine Measurement of Treated Water	Tubular Flow Type	1
Level Switch	Clear Water	Treated Water Level	Electrode type	1

Table 2-49 Outline of Instrumentation

Name	Installation site	Purpose of Installation	Туре	Quantity
1.000	Reservoir	Detection	-) 0	Quantity
Flow Meter	Clear Water	Treated Water Flow	Electromagnetic	1
	Reservoir Outlet	Measurement	φ800	1
Level Meter	Transmission Pipe	Water Level Measurement	Ultrasonic Type	2
Flow Meter	Transmission Pipe	Transmission Flow Measurement	Electromagnetic φ450	1
Pressure Gauge	Transmission Pipe	Transmission Pressure Measurement	Throwing Type	1
Flow Meter	Backwash Water Pipe	Backwash Water Flow Rate Measurement	Electromagnetic φ400	1
Level Switch	Drainage Pit	Drainage Pit Water Level Detection	Electrode Type	1
Level Meter	Waste Water Tank	Water Level Measurement	Ultrasonic Type	1
Level Meter	Sludge Tank	Water Level Measurement	Ultrasonic Type	1
Level Switch	Aluminum Sulfate Mixing Tank	Water Level Detection	Electrode Type	2
Level Switch	Polymer Mixing Tank	Water Level Detection	Electrode Type	2
Level Switch	Sodium Hypochlorite Mixing Tank	Water Level Detection	Electrode Type	2
Abudulah Pur	DC			
Pressure Gauge	Discharge Pipe	Distribution Pressure Measurement	Diaphragm Type	1
Flow Meter	Distribution Pipe	Distribution Flow Measurement	Electromagnetic φ250	1
Madina Town				
Flow Meter	Ground Reservoir Inlet	Measurement of receiving water flow rate	Electromagnetic φ350	1
Level Meter	Ground Reservoir	Water level measurement in the ground reservoir	Ultrasonic Type	2
Pressure Gauge	Discharge Pipe	Measurement of water supply pressure	Diaphragm Type	1
Level Meter	Overhead Reservoir	Water level measurement in the overhead reservoir	Ultrasonic Type	1
Flow Meter	Distribution Pipe	Distribution Flow Measurement	Electromagnetic φ350	1
DMA Zone 1-1	l, 1-2	<u>г</u>		T
Flow Meter	DMA-1 Distribution Pipe	DMA Flow Measurement	Electromagnetic Type	1 (add 1 in future)
Pressure Gauge	DMA-1 Distribution Pipe	DMA Pressure Measurement	Diaphragm Type	1 (add 1 in future)
DMA Zone 2-1	~2-4	·		. ,
Flow Meter	DMA-2 Distribution Pipe	DMA Flow Measurement	Electromagnetic Type	1 (add 3 in future)
Pressure Gauge	DMA-2 Distribution Pipe	DMA Pressure Measurement	Diaphragm Type	1 (add 3 in future)

(6) Measures against Inundation

In the inundation risk map, a part of Madina Town No. 2 DZ is designated as an inundation prone area (see Figure 2-8 in "2-2-1-2 Environmental Factors"). The water depth during inundation is about 300 mm from the ground level according to WASA-F.

Therefore, measures against inundation shall be taken into consideration for the two district meter chambers installed in the Madina Town No. 2 DZ. Concretely, the converters of flowmeters and pressure gauges, and the local station panels for monitoring shall be waterproofed.

2-2-2-8 Equipment for Water Quality Analysis

A water quality analysis equipment shall be installed in the water laboratory inside the administration building for the purpose of confirming raw water quality and monitoring the water quality in the water treatment process. Water quality analysis items to be performed are generally divided into daily, weekly, and monthly basis as follows.

- Daily: Water temperature, pH, turbidity, chromaticity, electrical conductivity, alkalinity, residual chlorine, ammonia, iron and manganese, bacteria and coliform
- Weekly: Total solids, total hardness, dissolved oxygen, and chlorine ions
- Monthly: Heavy metals, pesticides, etc.

The water quality parameters to be handled at the WTP shall be set to those listed for daily analyses. Other items shall be handled by WASA-F's central laboratory or external laboratories.

The water quality analyzers planned in the Project is presented in Table 2-50.

Equipment Name	Items Analyzed	Equipment Name	Items Analyzed
Water temperatur	Water temperature	Turbidity meter	Turbidity
gauge			
pH meter	pН	Residual chlorine analyzer	Residual chlorine
Conductivity meter	Conductivity	High-pressure incubator,	Bacteria, coliform
		Bacterial incubator,	
		Digital colony counter	
Titrator	Alkalinity	Spectrophotometer	Chromaticity, ammonia,
			iron, manganese

Table 2-50 Equipment for Water Quality Analysis

In addition, jar testers for coagulation tests and the following equipment are planned to be provided. Vacuum pump, dry oven, analytical balance, autoclave sterilizer, hot plate, refrigerator, clean bench, water purifier, test table, glassware

2-2-2-9 Water Supply Plan during Closing Period of RBC

(1) Proposed Plans

The water source in Faisalabad is mainly groundwater from tube wells installed along to the Chenab River and the JBC. The groundwater is transmitted to the terminal reservoir, and then distributed to the entire service area through the Arterial Main network.

Groundwater quality is shown in Table 2-51. The TDS values were 415 mg/L in average (min. 190 – max. 690) in the Chenab well field and 150 mg/L in average (min. 70 – max. 470) in the JBC well field. Turbidity was less than 0.01 NTU for both well fields. These values satisfied the Punjab Environmental Quality Standard. Since chlorine is injected as disinfection, the distributed water through Arterial Main meets the standard for drinking.

No	Item	Unit	Punjab Environmental Quality Standards (2016)	WHO Drinking Water Guideline (2011)	Chenab Well Field	JBC Well Field
1	Color	TCU	15	15	Colorless	Colorless
2	Odor	-	Odorless	Odorless	Odorless	Odorless
3	Taste	-	Unobjectionable	Unobjectionable	Good	Good
4	рН	-	6.5 - 8.5	-	<u>6.8-8.2</u> Ave. 7.3	<u>6.5-8.4</u> Ave. 7.3
5	Electric conductivity	μS/c m	-	-	<u>390-1,400</u> Ave. 770	<u>139-970</u> Ave. 290
6	Turbidity	NTU	< 5	< 5	< 0.01	< 0.01
7	Total Dissolved Solids	mg/L	< 1,000	< 1,000	<u>190-690</u> Ave. 415	<u>70-470</u> Ave. 150
8	Total hardness	mg/L	< 500	-	<u>72-420</u> Ave. 255	<u>43-280</u> Ave. 115
9	Arsenic (As) 2011	μg/L	≤ 50	10	<u><0.1-10</u> Ave. 3	-
10	Arsenic (As) 2014	μg/L	≤ 50	10	<u>5-14</u> Ave. 9.6	<u>5-18</u> Ave. 9.9

Table 2-51 Groundwater Quality

Source: M/P Project, "Annual Water Quality & Assessment Report for the Year 2015, WASA-F"

As presented under "2-2-1-2 Environmental Factors, (3) Closing Period of the RBC", the intake of the WTP stops during the RBC's closing period. On the other hand, water shall be continuously supplied. Under such case, supply volume and hour will be reduced from the regular operation, which is unavoidable.

The following are two options for water supply planning during the closing period of the RBC.

- Option 1: The existing Arterial Main of DN700 to 800mm is installed beside the target DZs along Jaranwala Road, a heavy traffic road, as shown in Figure 2-32 and Figure 2-33. Option 1 is to install new branch pipes from the Arterial Main or to utilize the existing branches from the Arterial Main to supply water to the DZs. In this option, the Old JK WTP is not operated for the treatment, and water is supplied for 6 hours per day. The reasons of such short supply hours are i) insufficient O&M budget due to insufficient amount of income from relatively low rate of water tariff, and ii) excess expenditure for electricity due to a large amount of leakage.
- Option 2: As shown in Figure 2-34, the Arterial Main (DN 800mm) is located along the northern

side of the Old JK WTP. Option 2 is to receive water from the Arterial Main to the new clear water reservoir and transmit water to Abudulah Pur DC (DC 1) and Madina Town No. 2 DC (DC 2) as ordinary operation. In this option, it is estimated that water is supplied for 18 hours per day at maximum for the daily minimum demand by an application of water at the raw water reservoirs and a control of the transmission volume by the pumps.

In comparing the above two options, the current supply of about 6 hours per day (water supply of three times a day for 2 hours each) should be also taken into consideration.

(2) Discussion on the Options

1) Option 1

In option 1, the existing Arterial Main is installed on Jaranwala Road which has a large traffic volume, and the diameter is as large as 700 to 800mm. Therefore, it is difficult to newly branch from the Arterial Main and connect to the planned water distribution primary main.

On the other hand, Abudulah Pur DZ has one distribution main of DN 300mm branched from the Arterial Main and Madina Town No.2 DZ has four branches of DN 200 to 600mm. It is possible to branch off from these branch mains to supply water instead of branching directly from the Arterial Mains.

Figure 2-32 shows the outline of Option 1 in Abudulah Pur DZ. Supply point #1 in the figure can be branched directly from the existing Arterial Main. However, the construction for a new branch from the Main to Supply point #1 involves risk since the Main is installed near the foundation of the flyover. Supply point #2 can be branched from the existing branch main. Since this DZ has a small amount of water demand, it is considered to use the existing branch main from the water demand viewpoint. It is judged from the above conditions that Supply point #2 is recommendable to be applied although the branch main is made of asbestos.

Figure 2-33 shows the outline of Option 1 in Madina Town No.2 DZ. Both supply points #1 and #2 can be branched from an existing branch main. Supply point #1 is branched from DN600mm asbestos pipe, which is branched from the existing Arterial Main (DN 700mm), installed along the road beside DZ at its north side. The supply point is hydraulically effective because of its large diameter. However, since WASA-F mentioned that the DN 600mm may have already been discarded, the supply point #1 needs to be investigated on whether the branch can be used or not.

Supply point #2 is branched from the existing Arterial Main (ND 700mm) installed along the main road beside DZ at its opposite side. Since the road is very wide (6 lanes with side roads and center separator) with heavy traffic, it is not recommendable to provide a new branch from the Main due to long length of road crossing works under heavy traffic. The existing branch pipe from the Main is available, which is DN250mm asbestos pipe and has a small hydraulic capacity considering the water demand of DZ.

Through the comparison above, Supply point #1 is recommendable to be applied because of the hydraulic advantage. The size of new branch pipe is 450mm and the material is DCIP.

2) Option 2

Figure 2-34 shows the outline of Option 2. The existing Arterial Main of DN 800mm is installed on the road adjacent to the Old JK WTP, and also the branch pipe of DN 600mm is branched into the WTP. A new connecting pipe having DN 400mm and about 50m length will be laid from the branch pipe to the filtered water effluent chamber of the rapid sand filter.

In addition, there is information from WASA-F that the existing value is installed on the branch of DN 600mm (DCIP). During the detailed design stage, it will be necessary to check whether or not the value can be operational by examining its operating conditions.

The detail calculation of the supply hour per day is described in Appendix 7 (4). The following is the brief explanation for the calculation.

- Effective volume of clear water reservoir: 2,400 m³
- Daily minimum demand: 13,500 m³
- Treatment volume of stored water at raw water reservoirs:
- 78,300 m³ (volume of raw water reservoirs) / 21 days (closing period of RBC) = $3,700 \text{ m}^3/\text{day}$
- Intake from Arterial Main: $13,500 \text{ m}^3/\text{day} 3,700 \text{ m}^3/\text{day} = 9,800 \text{ m}^3/\text{day}$ in 6 hours
- Operation of transmission pumps: flow control based on water level of clear water reservoir

The flow rate at 9,800 m³/day from the Arterial Main can be branched to the Old JK WTP based on the following reasons.

- 1) The water is currently supplied to the entire service area of WASA-F from the terminal reservoir. According to WASA-F, the current supply volume of the terminal reservoir is about 200,000 m³/day in average, of which the branched volume at 9,800 m³/day is about 5%.
- 2) The current demand in the service area of the Project is assumed to be 9,400 m³/day¹ in 2020, which is almost the same as the 9,800 m³/day. Therefore, the amount of water supplied to the service area other than the service area of the Project during the closing period of the RBC would be similar to the amount in 2020.
- 3) The branch flow at 9,800 m³/day has enough head to flow into the clear water reservoir of the Old JK WTP because the dynamic water level at + 192.8 m is higher than the water level of the effluent chamber of the rapid sand filtration at + 184.15 m. Note that the dynamic water level at + 192.8 m is calculated by a deduction of the head loss of about 4.2m up to the effluent chamber from the dynamic water level of +197.0 m at the branch point.

¹ In 2015, i) service population: 24,410, ii) per-capita consumption for domestic use: 128 L/day, iii) ratio of non-domestic use against total consumption: 10%, iv) physical loss: 40%, water demand = 24,410 x $0.128 \div (1-10\%) \div (1-40\%) = 5,790 \text{ m}^3/\text{day}$. The water demand in 2020 is calculated at 9,410 m³/day by linear interpolation between 9,410 m³/day in 2015 and 11,580 m³/day in 2023.

3) Comparison of the Options

The comparison between Option 1 and 2 is described in Table 2-52.

Item	Option 1		Option 2	
Materials of Existing	Asbestos pipe	Good	DCIP	Excellent
Branch Pipe				
(reliability)				
Supply Condition		Average		Excellent
Supply	Uncertain supply		Supply from DC	
pressure/amount	pressure			
Supply hour	6 hours in a day		18 hours in a day	
Economy		Excellent		Average
Length of new	Connection between		Connection between branch	
pipes connecting to	branch pipe (existing)		pipe (existing) and effluent	
the existing branch	and distribution		chamber of rapid sand filter	
	primary main (new) (10		(new) (50m x 1 place)	
	m x 2 places)			
Detention time of	1 hour (1,900 m ³)		1.2 hour (2,400 m ³)	
clear water				
reservoir				
Overall Evaluation				Selected

Table 2-52 Comparison of Water Supply Plans during Closing Period of RBC

Tapping pressure is not assured either at the existing Arterial Main or branch pipe in Option 1, while supply pressure from DC is assured in Option 2. Also the connection work between the new distribution primary main and either the Arterial main or branch pipe for Option 1 is not included under the project scope, which shall be implemented by WASA-F, while the work under Option 2 is included in the project scope to be carried out by the Japanese contractor. In addition, the water supply hour is long enough under Option 2. From the above conditions, Option 2 is recommended to be adopted.

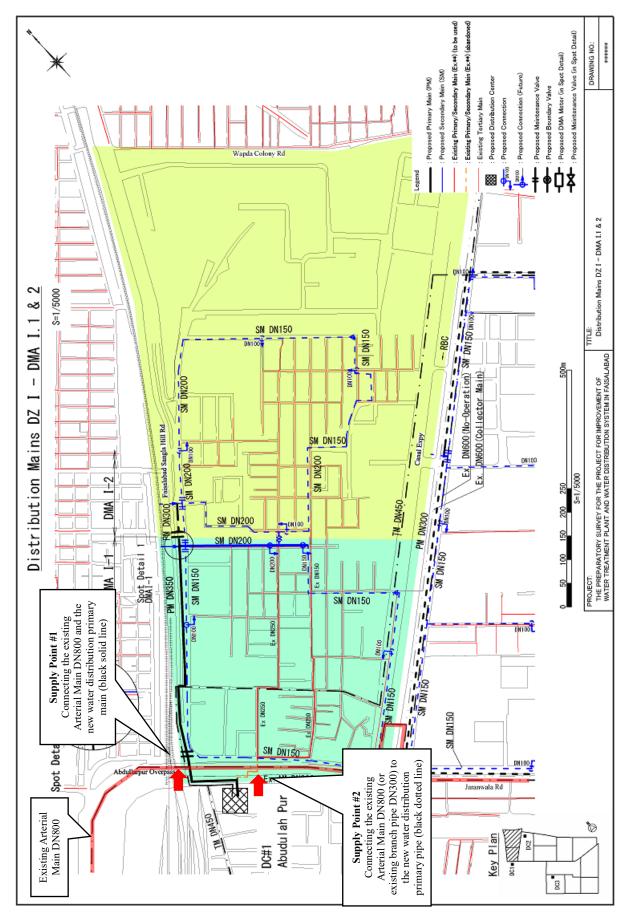


Figure 2-32 Water Supply Plan Option 1 during Closure of RBC in Abudulah Pur Area

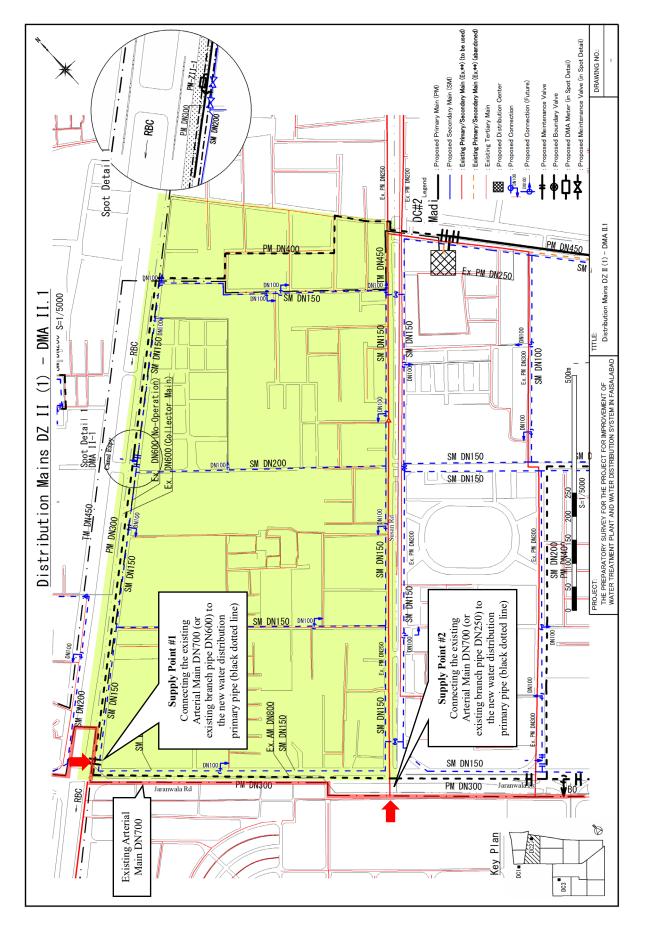


Figure 2-33 Water Supply Plan Option 1 during Closure of RBC in Madina Town Area

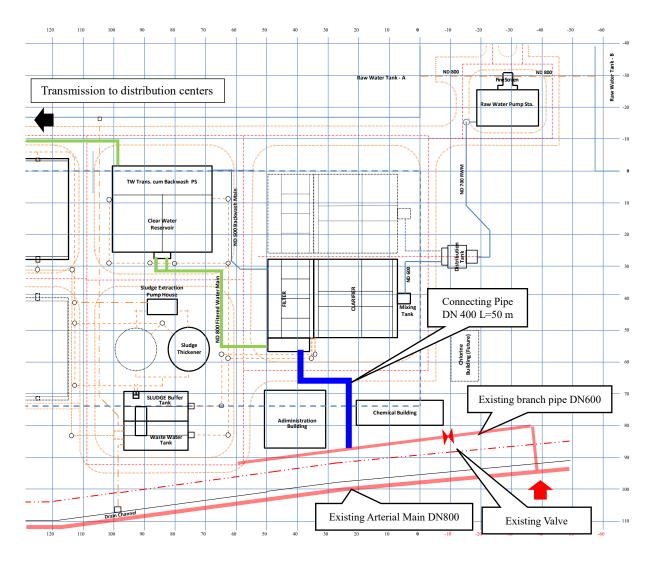


Figure 2-34 Water Supply Plan Option 2 during Closure of RBC

2-2-3 Outline Design Drawing

Table 2-53 shows the list of outline design drawings for the Project. The drawings are attached to Appendix 7 (5).

FACILITY	DRAWING NO.	DRAWING TITLE
WATER TREATMENT	WTP-01	GENERAL LAYOUT OF WATER TREATMENT PLANT
PLANT	WTP-02	LAYOUT OF INTAKE FACILITIES
	WTP-03	INTAKE MOUTH
	WTP-04	CONNECTION FACILITIES OF STORAGE TANK
	WTP-05	RAW WATER DISTRIBUTION VALVE CHAMBER
	WTP-06	RAW WATER PUMP STATION
	WTP-07	RECEIVING AND DISTRIBUTION TANK
	WTP-08	COAGULATION, SETTLING TANK AND RAPID SAND FILTER (1)
	WTP-09	COAGULATION, SETTLING TANK AND RAPID SAND FILTER (2)
	WTP-10	COAGULATION, SETTLING TANK AND RAPID SAND FILTER (3)
	WTP-11	COAGULATION, SETTLING TANK AND RAPID SAND FILTER (4)
	WTP-12	CLEAR WATER RESERVOIR AND TRANSMISSION PUMP STATION (1)
	WTP-13	CLEAR WATER RESERVOIR AND TRANSMISSION PUMP STATION (2)
	WTP-14	WASTE WATER TANK (1)
	WTP-15	WASTE WATER TANK (2)
	WTP-16	SLUDGE GRAVITY THICKENER
	WTP-17	SLUDGE TRANSFER PUMP STATION
	WTP-18	SLUDGE DRYING BED
	WTP-19	ADMINISTRATION BUILDING (1) - LAYOUT PLAN
	WTP-20	ADMINISTRATION BUILDING (2) - SIDE VIEW
	WTP-21	ADMINISTRATION BUILDING (3) - SECTION
	WTP-22	ADMINISTRATION BUILDING (4) - SECTIONAL DETAILS
	WTP-23	CHEMICAL BUILDING - LAYOUT PLAN
	WTP-24	CHEMICAL BUILDING - SIDE VIEW
	WTP-25	CHEMICAL BUILDING - SECTION
	WTP-26	CHEMICAL BUILDING - SECTIONAL DETAILS
ABUDULAH PUR	DC#1-01	GENERAL LAYOUT
DISTRIBUTION	DC#1-02	GROUND RESERVOIR (1)
CENTER	DC#1-03	GROUND RESERVOIR (2)
	DC#1-04	OVERHEAD RESERVOIR (1)
	DC#1-05	OVERHEAD RESERVOIR (2)
MADINA TOWN NO.2	DC#2-01	GENERAL LAYOUT
DISTRIBUTION	DC#2-02	GROUND RESERVOIR (1)
CENTER	DC#2-03	GROUND RESERVOIR (2)
	DC#2-04	GROUND RESERVOIR (3)
	DC#2-05	GROUND RESERVOIR (4)
	DC#2-06	GROUND RESERVOIR (5)
	DC#2-07	OVERHEAD RESERVOIR (1)
	DC#2-08	OVERHEAD RESERVOIR (2)

Table 2-53 List of outline design drawings

FACILITY	DRAWING NO.	DRAWING TITLE
TRANSMISSION MAIN	TM-01	PLAN AND PROFILE OF TRANSMISSION MAIN (1)
	TM-02	PLAN AND PROFILE OF TRANSMISSION MAIN (2)
	TM-03	PLAN AND PROFILE OF TRANSMISSION MAIN (3)
	TM-04	PLAN AND PROFILE OF TRANSMISSION MAIN (4)
	TM-05	PLAN AND PROFILE OF TRANSMISSION MAIN (5)
	TM-06	PLAN AND PROFILE OF TRANSMISSION MAIN (6)
	TM-07	PLAN AND PROFILE OF TRANSMISSION MAIN (7)
	TM-08	PLAN AND PROFILE OF TRANSMISSION MAIN (8)
	TM-09	PLAN AND PROFILE OF TRANSMISSION MAIN (9)
	TM-10	PLAN AND PROFILE OF TRANSMISSION MAIN (10)
	TM-11	PLAN AND PROFILE OF TRANSMISSION MAIN (11)
	TM-12	PLAN AND PROFILE OF TRANSMISSION MAIN (12)
	TM-13	PLAN AND PROFILE OF TRANSMISSION MAIN (13)
	TM-14	PLAN AND PROFILE OF TRANSMISSION MAIN (14)
	TM-15	CROSS SECTIONS OF TRANSMISSION MAIN (1)
	TM-16	CROSS SECTIONS OF TRANSMISSION MAIN (2)
	TM-17	CROSS SECTIONS OF TRANSMISSION MAIN (3)
	TM-18	CROSS SECTIONS OF TRANSMISSION MAIN (4)
	TM-19	CROSS SECTIONS OF TRANSMISSION MAIN (5)
	TM-20	SPOT DETAIL OF TRANSMISSION MAIN (1)
	TM-21	SPOT DETAIL OF TRANSMISSION MAIN (2)
	TM-22	PIPE BRIDGE (TRANSMISSION MAIN)
DISTRIBUTION MAIN	PM-01	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN, ABUDULAH PUR (1)
	PM-02	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN, ABUDULAH PUR (2)
	PM-03	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN, ABUDULAH PUR (3)
	PM-04	CROSS SECTIONS OF DISTRIBUTION PRIMARY MAIN, ABUDULAH PUR
	PM-05	SPOT DETAIL OF DISTRIBUTION PRIMARY MAIN, ABUDULAH PUR
	PM-06	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN, MADINA TOWN NO.2 (1)
	PM-07	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN, MADINA TOWN NO.2 (2)
	PM-08	CROSS SECTIONS OF DISTRIBUTION PRIMARY MAIN, MADINA TOWN NO.2
	PM-09	SPOT DETAIL OF DISTRIBUTION PRIMARY MAIN, MADINA TOWN NO.2
	SM-01	KEY PLAN OF DISTRIBUTION SECONDARY MAIN
	SM-02	PLAN OF DISTRIBUTUION SECONDARY MAIN, ABUDULAH PUR
	SM-03	CROSS SECTIONS OF DISTRIBUTION SECONDARY MAIN, ABUDULAH PUR
	SM-04	SPOT DETAIL OF DISTRIBUTION SECONDARY MAIN, ABUDULAH PUR
	SM-05	PLAN OF DISTRIBUTUION SECONDARY MAIN, MADINA TOWN NO.2 (1)
	SM-06	PLAN OF DISTRIBUTUION SECONDARY MAIN, MADINA TOWN NO.2 (2)
	SM-07	PLAN OF DISTRIBUTUION SECONDARY MAIN, MADINA TOWN NO.2 (3)
	SM-08	PLAN OF DISTRIBUTUION SECONDARY MAIN, MADINA TOWN NO.2 (4)
	SM-09	CROSS SECTIONS OF DISTRIBUTUION SECONDARY MAIN, MADINA TOWN NO.2
	SM-10	SPOT DETAIL OF DISTRIBUTION SECONDARY MAIN, MADINA TOWN NO.2 (1)
	SM-11	SPOT DETAIL OF DISTRIBUTION SECONDARY MAIN, MADINA TOWN NO.2 (2)
	SM-12	SPOT DETAIL OF DISTRIBUTION SECONDARY MAIN, MADINA TOWN NO.2 (3)

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Organization for Project Implementation

The project will be implemented in accordance with the Japanese Grant Aid scheme. For the implementation, it is necessary to sign the Exchange of Notes between the Government of Japan and the Ministry of Economic Affairs (MED) of the Government of Pakistan, and the Grant Agreement (hereinafter referred to as G/A) between JICA and MED. After that, the executing agency will conclude a consulting service agreement with a consultant for detailed design and construction supervision and a contract with a contractor for construction of the facilities. Both the consultant and contractor must be Japanese corporate bodies. Figure 2-35 presents the organization structure for project implementation.

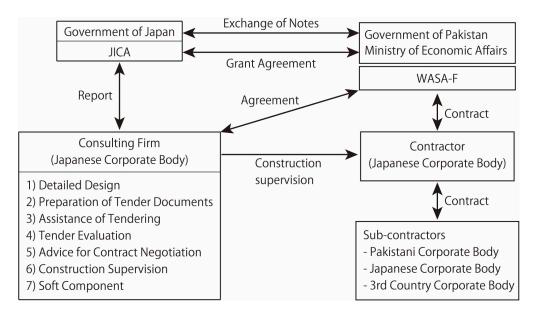


Figure 2-35 Organization Structure for Project Implementation

(2) Implementation Agency

The implementation agency is WASA-F, which will be responsible for the operation and maintenance of the facilities to be constructed in the Project.

(3) Consulting Firm

A Japanese consulting firm will implement the detailed design, prepare the tender documents, and supervise the construction. The firm shall be selected in consideration of experience on the design and construction supervision of water supply facilities. The Japanese consulting firm is responsible for the Project components agreed under the G/A.

(4) Contractor

Under the framework of the Japan's Grant Aid system, the contractor (Japanese corporate body) selected through bidding will be responsible for the construction of the facilities agreed under the G/A. The selected contractor must have the ability to complete the work as well as knowledge of the local market, labor laws, culture, and customs.

(5) Personnel Assignment of the Contractor

The contractor is required to secure the specified quality at each stage of construction of the WTP and transmission and distribution facilities, installation of mechanical and electrical facilities, and the test operation to be conducted before handing over to the Pakistani side. In order to ensure the quality of the works, the contractor will assign a Project Manager as the site representative for the entire construction period and dispatch the following engineers from Japan for each type of work:

- Civil Engineer (3)
- Mechanical Engineer (1)
- Electrical Engineer (1)
- Architect (1)
- Safety Management Engineer (OHR) (1)
- Data System Engineer (1)
- Safety, Procurement, and Administrative specialist (1)

In addition, the contractor will dispatch two personnel assigned as members of the quality control meetings in every six months.

2-2-4-2 Implementation Conditions

(1) Considerations for Construction

- 1) WTP
 - The intake mouth is installed at the right bank of RBC. RBC is closed in January for maintenance purposes while water flows daily except for the duration of the maintenance. The construction of WTP will be scheduled in consideration of this maintenance period of RBC.
 - Raw Water Transmission Main is to be installed under Canal Road, a major road in Faisalabad. It is not easy to close the entire road during the installation. Therefore, the partial closure of the road will be repeated. The safety measures should be carefully considered, such as placing signboards and controlling traffic by traffic guides.
 - Some facilities at Old JK WTP will remain as they are located and will be continuously utilized even during the construction period. The location of the temporary yard for the construction materials and the traffic route for construction vehicles should be planned carefully to prevent interference in continuous operation of the facilities.
 - A part of the construction works is implemented at 4 m below the current ground level. A temporary fence should be installed for safety measures.

• During the closing period of RBC, treated water is to be served from the existing branch pipe of the Arterial Main to the rapid sand filter. The connection pipes between the rapid sand filter and the branch pipe is installed in the Project. Such connection works will be conducted during the non-supply-hours to mitigate inconvenience to customers.

2) Distribution Centers

- OHR to be constructed in the Project has a total height of approximately 35 m. The contractor is to assign a Safety Management Engineer (OHR) specifically for the construction of the OHR. Safety measures should be taken for working at height under guidance by the Engineer.
- As the distribution center of Abudulah Pur faces the road with heavy traffic, safety measures will be employed to control the traffic, especially at the entrance, by traffic guides.

3) Transmission and Distribution Mains

- Pipes for the transmission and distribution are to be installed under the driveway and walkway of the road. Safety measures should be taken to avoid any accidents, such as falling into the working ditch, by vehicles, motorbikes, bicycles, and passers-by. Measures such as placing temporary fences with signboards and controlling traffic by traffic guides will be employed.
- Roads may be closed partially or entirely during the works. Together with advance notices, safety measures will be taken, such as placing signboards and controlling traffic by traffic guides.
- In case that underground facilities are found on the route of the pipelines during the works, measures will be taken to relocate the facilities or change the planning route of the Project. Such decisions should be made swiftly based on discussions among relevant authorities.

(2) Considerations for Procurement

Attention should be paid to the procedures for taxation and tax exemption, as explained below, in the procurement of goods in the Project:

- Equipment and materials transported by sea from Japan and the third countries are disembarked at the port of Karachi. The longer the custom clearance process takes, the longer the storage period will be in the warehouse. The demurrage fee will be charged if the storage period exceeds six days.
- The customs duty is exempted if the approval process for the exemption is conducted from WASA-F to MEA and from MEA to Custom House Karachi.
- The infrastructure cess of 3-5% levied in Sindh Province is not exempted. Punjab Province will bear this cost.
- The provincial excise duty in Punjab on construction materials are exempted.

2-2-4-3 Scope of Works

Table 2-54 shows the demarcation of responsibilities in the works between the Japanese side and the Pakistani side. The Japanese side is responsible for the facility construction while the Pakistani side is

responsible mainly for the preparation of the works. In addition, the Pakistani side is responsible to connect the distribution main between the existing and the new.

Table 2-54Demarcation of Responsibilities in the Construction Works between theJapanese Side and Pakistani Side

Construction / Procurement • installation classification	Japan	Pakistan
Water Treatment plant		
1) Restoration of Raw Water Tank A		х
2) Removal of existing facilities		х
3) Construction	х	
4) Installation of power service cable to the project site		Х
5) Pipe installation from existing pipes to clear water	х	
reservoir (during the closure of RBC)		
Distribution Center		
1) Construction	х	
2) Installation of power service cable		х
Distribution		
1) New pipe installation	х	
2) Connection between existing and new pipes		х

2-2-4-4 Consultant Supervision

The consultant will carry out the detailed design, tendering assistance, construction supervision, and soft components (refer to "2-2-4-8 Soft Component (Technical Assistance) Plan").

(1) Detailed Design

The consultant is responsible for carrying out the detailed design and preparation of bid documents and others.

(2) Tendering Assistance

In accordance with "the Guideline to Consultancy Services under Japan's Grant Aid" (May 2016)", the consultant will assist Pakistani implementing agency for fair and smooth tendering. The following is the main schedule and assistance by the consultant for the tendering.

- 1) The deadline for submitting pre-qualification (PQ) documents is one week after the announcement of PQ. The consultant receives the PQ documents from contractors who are interested in participating in the bidding.
- 2) The consultant evaluates the submitted PQ documents and informs the evaluation results to the bidders.
- 3) The consultant distributes tender documents to the qualified bidders.

- 4) The tendering is conducted after approximately 60 days from the distribution of the tender documents.
- 5) The consultant recommends the bidder with the lowest price to the Pakistani side and assists the signing of the contract agreement between the Pakistani side and the contractor.

(3) Construction Supervision

The consultant will mainly undertake the following tasks for construction supervision:

- Review and approval of drawings prepared by the contractor
- Checking of main materials and equipment on site
- Guidance to safety and supervision of construction quality
- Supervision of construction schedule
- Report on progress of construction to the Japanese side and the Pakistani side
- Support on necessary processes required by the Pakistani side under the Japan's Grant Aid
- Presence at test operation
- Inspection after completion of the works

The project component consists of construction of intake facility, water treatment plant, and transmission and distribution facilities, which involves civil, architectural, mechanical, and electrical works. As each of the related works needs to be properly supervised from the beginning to the completion of the works, one full-time resident engineer is to be assigned. Furthermore, engineers in the relevant fields of expertise will be dispatched according to the construction schedule. Requirements in the staffing plan of the consultant team and tasks of the assigned personnel are described as follows:

Project Manager

The main role of the project manager is to hold construction quality management meetings and discuss the progress of the work (item, period), construction quality, and safety measures. These meetings are to be held before the commencement of the construction and once every six months during the construction.

Resident engineer

The resident engineer will stay continuously in Faisalabad and supervise civil and architectural works, and procurement. The main tasks of the resident engineer are as follows:

- Keeping documents such as bidding documents, standards, specifications, and documents submitted by the contractor
- · Review and approval of construction plan, schedule, and drawings
- Inspection and approval of materials and equipment for construction works
- Supervision, inspection, and approval of construction

- Supervision of construction progress
- Inspection of safety measures for construction taken by the contractor
- Holding meetings among the executing agency, consultant, and contractor
- Inspection and approval of completion drawings
- Provision of advice and guidance to the contractor as needed

Personnel to be Dispatched for Short-Term Assignment

The experts listed below will be dispatched to Faisalabad according to the schedule of the construction works.

1) Civil engineer

A civil engineer supervises the installation of i) the pipes for the transmission and distribution, and inside distribution centers, and ii) the auxiliary equipment.

2) Mechanical and electrical engineer

A mechanical and electrical engineer supervises the installation of mechanical and electrical equipment/facilities such as pumps, facility pipes, power receiving and transforming, and instrumentation.

3) Monitoring system engineer

A monitoring system engineer supervises the installation of the monitoring system which checks flow rate, pressure, water quality, and pump operation, and collects these data.

4) Operation engineer

An operation engineer supervises the entire trial operation of WTP, distribution centers, and pipelines.

2-2-4-5 Quality Control Plan

The contractor will construct the facilities using materials of the quality specified in the contract. The consultant will instruct the contractor to conduct the necessary analyses and tests, and supervise the quality of the construction works. The following is the main items for quality control by the contractor:

(1) Procurement

a) Concrete

After confirming that the quality of cement, aggregate, and water meets the requirements of the specifications and applicable standards, the design of mix proportion with the necessary tests is conducted to determine the proportion.

b) Reinforcing bar

The suitability of the products is determined by checking the material test results issued by the manufacturer.

c) Pumps and pipes

The standards and performance of the products are verified with the requirements of the specifications.

(2) Transportation

a) Concrete

Since concrete needs to be poured within 1.5 hours of mixing, waiting time on site should be minimized by liaison between the factory and the site.

b) Pumps and pipes

Appropriate packing methods should be selected for each equipment and material in order to avoid deterioration of function and quality during transportation.

(3) Upon delivery to the site

a) Concrete

The quality is checked by measuring slump, air volume, and concrete temperature.

b) Reinforcing bar

Tensile and bending tests are applied to the test piece sampled from the delivered products.

c) Pumps and pipes

The dimensions, paint, operating condition, and quality assurance certificate are checked.

The quality control of equipment and materials at the time of delivery to the site is summarized in Table 2-55.

Type of construction works	Item to be checked	Quality Control	Methodology
Piping	Pipe	Material, Dimension,	Visual observation, Dimension
		Strength	measurement, Product certificate
Reinforced	Aggregate, Cement,	Material, Strength	Physical and chemical test, Grain
concrete	Water, Concrete		size analysis, Slump, air volume,
			and chloride amount test,
			Compression test
	Reinforced bar	Strength, Dimension	Tensile test, Dimension
			measurement, Product certificate
Electrical and	Pump	Specification	Visual observation, Product
mechanical			certificate
equipment	Valve	Specification	Visual observation, Product
			certificate

Table 2-55 Quality Control at the Time of Delivery to the Site

(4) Storage

a) Reinforcing bar

The product is placed on wood in order to avoid direct contact with the ground, and covered with sheets.

b) Pumps and Pipes

The pumps are kept indoors to prevent deterioration of its function. The pipes are placed on wood in order to avoid direct contact with the ground, and covered with sheets.

(5) Construction / Installation

a) Concrete

Test pieces for the compression strength are collected for every pour. The one-week and four-week strengths of the test pieces are checked against the requirements. The test results are used to detect abnormal values, investigate the cause, and take applicable countermeasures.

b) Reinforcing bar

The product is checked whether the bar arrangement (diameter and pitch) is as per the design and whether the concrete covering is within the specified range.

c) Pumps and Pipes

Installation of the product is checked whether the product is installed as per the design. For pipes embedded in concrete, the position is checked at the time of installation and after concrete pouring.

d) Foundation for structure

Since the direct foundation is applied to the structures in the WTP and the distribution centers, the plate bearing test is conducted in order to confirm the strength of the ground.

Table 2-56 summarizes the quality control measures during construction and installation.

Type of construction works	Item to be checked	Quality Control	Methodology	
Piping	Pipe installation	Condition of connecting point, leakage	Visual observation, hydraulic test	
Reinforced concrete	Concrete	Strength	Compressive strength test	
(after pour)	Structure form	Dimension of structure	Dimension measurement	
	Water tightness	Leakage	Filling water test	
Civil works	Foundation	Bearing capacity	Loading test	
Electrical and	Pump	Installation condition	Inspection of installation	
mechanical equipment	Valve	Installation condition	Visual observation, Operation test	

 Table 2-56
 Quality Control during Construction and Installation

2-2-4-6 Procurement Plan

(1) Procurement Plan for Equipment and Materials

In the light of the policy of Japanese Grant Aid, equipment and materials will be procured in Japan or Pakistan in principle. If some goods are difficult to purchase from Japan or Pakistan, they will be procured from a third country. Sources of supply of equipment and materials will be determined with full consideration of the following conditions:

- The quality of equipment and materials must meet the requirements.
- The equipment and materials to be procured in the Project can be purchased domestically in Pakistan to the greatest extent possible
- Consumables of the equipment are available in Pakistan.
- Repair and maintenance of the equipment do not require an extremely high level of skills.
- The price of the product is reasonable.

Table 2-57 shows the sources of procurement for major equipment and materials. Almost all the construction materials and equipment are available in Pakistan. Valves, pumps, motors, control panels, and instruments will be procured from Japan, Pakistan, or a third country, depending on the specifications.

Item	Sources of Procurement
Coarse aggregates for concrete and asphalt	Pakistan
Reinforcement, steel, etc.	Pakistan
HDPE, PVC, steel pipes and fittings	Pakistan or third country
DCIP	Japan or third country
Valves	Japan, Pakistan or third country, depending on the type, diameter, and other conditions
Power cables	Japan or Pakistan
Pumps	Japan or third country
Instrumentations	Japan, Pakistan or third country
Control Panels	Japan, Pakistan or third country
Sand for filtration	Pakistan

 Table 2-57
 Sources of Procurement for Major Equipment and Materials

Construction machinery will be procured in Pakistan as it can be leased from local contractors.

(2) Transportation plan

Equipment and materials transported by sea from Japan and third countries will be disembarked at Karachi Port. After the customs clearance, the goods will be trucked to Faisalabad. Figure 2-36 shows the route for inland transport. The distance between Karachi and Faisalabad is about 1,100 km.

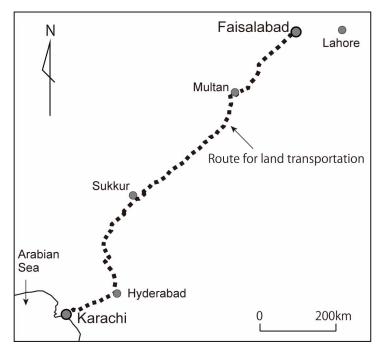


Figure 2-36 Inland transportation route

2-2-4-7 Operation Guidance Plan

The operational guidance for facilities and equipment constructed/installed by the Project is provided by the contractor. Table 2-58 describes main components for the guidance.

Facility	Guidance		
WTP	- Explanation of specification and function for each facility/equipment		
	- Operational guidance for each pump and valve		
	- Operational guidance for SCADA and each facility with a control of water quality and		
	flowrate on site		
	- Measures for each facility/equipment during power failure		
	- Maintenance for each facility/equipment		
	- Safety caution on handling chemicals		
Transmission	- Operational guidance for valves		
Main			
Distribution	- Explanation of specification and function for each facility/equipment		
Center	- Operational guidance for each pump and valve		
	- Water level and flowrate control		
	- Confirmation of SCADA and on-site data		
	- Maintenance for each facility/equipment		
	- Safety caution on handling chemicals		
Distribution Main	- Explanation of specification and function for each facility/equipment		
	- Operational guidance for valves		
	- Confirmation of SCADA and on-site data		
	- Maintenance for each facility/equipment		

 Table 2-58
 Main Components for Operational Guidance by the Contractor

2-2-4-8 Soft Component (Technical Assistance) Plan

The components of equipment installed in the Old JK WTP is almost the same as the ones for the water treatment methods adopted in the New JK WTP. However, the Old JK WTP will employ a different water treatment system, as the existing slow sand filtration system is replaced with coagulation, sedimentation and rapid sand filtration system.

Since the modification of water treatment method at Old JK WTP will be a significant change for the counterpart personnel, it is necessary to provide the training on the water treatment method both in theoretical and practical points of view. In addition, it is a good opportunity for the staff at New JK WTP to review and upgrade the procedure of operation of New JK WTP through the training. Therefore, the training is planned for both staff of Old JK WTP and New JK WTP.

In the water transmission/distribution processes, the proper operations shall be required such as monitoring of water level of reservoirs and opening and closing of valves. If improperly operated, overflow or shortage of water may occur. If the experiences and lessons learnt in these incidents are not shared, the skills of staff and service level may not be improved. As similarly discussed above for the training in the water treatment methods, it is necessary to provide the training on the water transmission/distribution processes both in theoretical and practical points of view.

Above two categories of the trainings are explained by the outputs, activities and achievements as follows.

(1) Training on O&M of water treatment facilities

[Output 1] Capacity to operate and maintain WTP is improved.

By improving O&M skills, the facilities of WTP are appropriately operated and maintained according to the operation manual. As the result, water is supplied stably and efficiently, satisfying the planned demand and the required quality.

- The following operations are properly implemented; i) the water intake/water treatment is carried out with the amount in accordance with the water demand, and ii) the chemical dosage is carried out based on the raw water quality and monitoring data such as turbidity and pH, etc.
- The Old JK WTP is properly operated in compliance with established water treatment methods for non-regular conditions such as power failure, suspension of water intake, equipment failure, and inspections.
- The maintenance plan of the water treatment facilities (including the inspection/repair cycle (regular/urgent) of electrical equipment/devices) is properly implemented, and the repair plan including cleaning is prepared.

(2) Training on O&M of water transmission/distribution facilities

[Output 2] Capacity to operate and maintain water transmission/ distribution facilities is improved.

By improving O&M skills in the operation of the facilities for water transmission/distribution, pumps are operated stably and efficiently together with flow rate adjustment.

• Pumps are efficiently operated with adjustment of flow rate according to changes in demand.

• Water is continuously transmitted and distributed in extraordinary circumstances such as during the closure of RBC.

	Outputs	Activities (Learning Items)
	1) Water is produced according to the water demand plan.	 Knowledge on functions of Old JK WTP Knowledge of chemicals, required water quality test methods Daily data recording and analysis Operation of WTP
[Output 1] Capacity to operate and maintain WTP is improved.	2) Operation method of Old JK WTP under unusual circumstances is established and implemented.	 Identification of unusual situations Establishment and application of operation method by analysis based on various data
is improved.	3) Water treatment facilities are properly maintained with storing its data/documents for a certain period.	 Procedure on obtaining inspection data for equipment at New JK WTP Operation of equipment Inspection and repair procedure with items for each facility
[Output 2] Capacity to operate and maintain water	1) Pumps are efficiently operated with adjustment of flow rate according to changes in demand.	 Knowledge on functions for newly established water transmission/distribution facilities Operation of water transmission/distribution facilities including pump operation and water level monitoring
transmission/ distribution facilities is improved.	2) Water is continuously transmitted and distributed when RBC is closed.	1. Procedure of transmitting and distributing water continuously and communication system

 Table 2-59
 Soft Component Activities (Learning items)

The purpose of the soft component is i) to improve O&M capacity of water treatment facilities, and ii) to improve O&M capacity of water transmission/distribution facilities.

For the evaluation, the indicators and verification are described in Table 2-60. For achieving the purpose efficiently and effectively, the trainings are carried out by the Japanese consultant and local engineers for 1st and 2nd Phases.

Outputs	Verified Indicators / Inputs	Means of Verification (1st and 2nd phases)
[Output 1] Capacity to operate and maintain WTP is improved.	 Water is produced according to the water demand plan. 1 Japanese engineer: 35 days, Work in Japan: 2 days 1 local engineers (water treatment engineer is responsible for water quality, too): 28 days 	 1-1) It is confirmed by the achievement confirmation list* that the operation of receiving water and water treatment facilities can be implemented stably and efficiently. 1-2) It is confirmed by the work manual and the achievement confirmation list* that the data required for operation is recorded and analyzed. 1-3) It is confirmed by the work manual and the achievement confirmation list* whether suitable methods for water quality analysis are applied for changes in water quality.

Table 2-60 Evaluation of Achievement for Soft Component

Outputs	Verified Indicators / Inputs	Means of Verification (1st and 2nd phases)
		*All items on the confirmation list must be checked.
	 2) Operation method of Old JK WTP under unusual circumstances is established and implemented. 1 Japanese engineer: 8 days, Work in 	 2) It is confirmed by the achievement confirmation list* that WASA-F counterparts can operate the equipment independently. *All items on the confirmation list must be
	Japan: 1 day • 1 local engineers: 7 days	checked.
	 3) Inspection and repair plan of water treatment facilities are properly maintained with storing its data/documents for a certain period. 1 Japanese engineer: 8 days, Work in Japan: 1 day 1 local engineers: 7 days 	 3) It is confirmed by the achievement confirmation list* that the actual facilities and equipment are properly inspected according to the maintenance manual. *All items on the confirmation list must be checked.
[Output 2] Capacity to operate and maintain	 Pumps are efficiently operated with adjustment of flow rate according to changes in demand. 1 Japanese engineer: 9 days, Work in Japan: 1 day 1 local engineers: 8 days 	 It is confirmed by the work manual and the achievement confirmation list* that WASA-F counterparts can independently operate the facilities and equipment according to the work manual. *All items on the confirmation list must be checked.
water transmission/ distribution facilities is improved.	 2) Water is continuously transmitted and distributed when RBC is closed. 1 Japanese engineer: 3 days, Work in Japan: 1 day 1 local engineers: 2 days 	 2) It is confirmed by the procedure manual and the achievement confirmation list* that the facilities are properly operated against unforeseen circumstances according to the work manual. *All items on the confirmation list must be checked.
[Output 1&2] When Japanese engineer is not in Pakistan	• 2 local engineers: 22 days in total	When there is no Japanese engineer between the period of Output 1 and 2, the local engineers will remotely instruct the trainees under the direction of the Japanese engineer, and will have a question and answer session with the trainees.

Table 2-61 summarizes the inputs of the consultants for the soft component.

Item	Phase	Working Place	Japanese Engineer	Local Engineer
	First	Pakistan	39 person-days	33 person-days
	Second	Pakistan	12 person-days	9 person-days
Output 1	-	Japan	4 person-days	-
	Sub total	Pakistan	51 person-days	42 person-days
	Sub total	Japan	4 person-days	-
Outrout 2	-	Pakistan	12 person-days	10 person-days
Output 2	-	Japan	2 person-days	-
Without Japanese*	-	Pakistan	-	22 person-days
Total	-	Pakistan	63 person-days	74 person-days
I otal	-	Japan	6 person-days	-

 Table 2-61
 Inputs of Consultants for Soft Component

*: During absence of Japanese engineer in Pakistan

2-2-4-9 Implementation Schedule

Table 2-62 presents the implementation schedule.

	Τ																						Mo	onth	ıs																				
Item	1	2	3	4	5	6	7	7 8	9	10	0 1	1 12	2 13	3 14	4 1	5 16	5 17	7 1	8 1	9 2	0 21	22	2 23	24	4 25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44 4	45 4
Cabinet Approval									Ι																																	Τ	Τ	Τ	Т
E/N、G/A									Ι																																	Τ	Τ		Τ
Contract with Consultant																																											Τ		
Detailed Design				-		-	+	-		┝																																Τ	Τ	Τ	Τ
Field Survey				-			-																																						Τ
Analysis and Detailed Design					_		+		+																																	T	T	Τ	Τ
Comparison of OD and DD																																										T	T		Τ
Preparation of Bidding Document								-																																		Τ	Τ		
Approval of Bidding Document										┝							Τ			T																						Τ	T		Τ
Tender										Ι							Ι			Τ																						Τ	Τ		Τ
Prequalification (P/Q)									Ι	Ι	-																															Τ	Τ	Τ	Т
Tender (Announcement, Bidding, Evaluation)									T		•		+							T																									T
Contract with Contractor			Τ							Ι							Τ			Τ																						Τ	Τ		Τ
Construction																-	+	-	-	+	-										_										-	►			Τ
Preparation			Ι							Ι				-		+	┢			Τ																						Τ	Τ		Τ
WTP																	-	-	-	-	-										_		_								_	Τ	Τ		
Transmission M ain									T											•	-					+																T	T	T	T
Distribution Centers	T								T	T		1										T	1	-																		T	T	T	T
Distribution Main									1	1												I	1			l							-									T	T	T	T
Commisioning, clean up	T	T	T			T		T	T			1		T			T		1	T	Τ	Γ			1	T	ĺ														┛	-†	T	T	T
Soft component	1								T	T												T	1			Γ															-	╡	╡	4	┢

 Table 2-62
 Project Implementation Schedule

2-3 Security Plan

The number of terrorist incidents in Pakistan has been on a downward trend since its peak in 2009. However, terrorist attacks have continuously occurred mainly in the northwest and southwest of the country. Although public security is relatively well maintained in Faisalabad, daily safety caution is essential. As daily safety measure, the updated information shall be collected through JICA Pakistan Office, Embassy of Japan in Pakistan, C/P and local staff.

The followings are the further security measures.

1) Accommodation

The place to stay shall be confirmed by JICA Pakistan Office for the security purpose.

2) Vehicle

The driver familiar with the local circumstances such as custom and road condition, etc. shall be employed. The armed security guard(s) shall be employed and ride on the vehicle with the Consultants and the Contractor.

3) Project office

The security system of 24-hour guards and security cameras are applied. For the safety measure at entrance, the traffic guides are assigned.

4) Construction site at distribution centers

The security system of 24-hour guards and security cameras are applied. The armed security guard(s) shall keep the security of the Consultants and the Contractor. For the safety measure at entrance, the traffic guides are assigned.

2-4 Obligations of Recipient Country

2-4-1 Obligations of Recipient Country: Works

When the Project is implemented under the Japan's Grant Aid scheme, the Pakistani government needs to carry out the obligations described below. Table 2-63 presents the expected due dates for the completion of the obligations (Works).

No	Item	Expected due date for completion (expected month/year)	Responsibility	Remarks
1	Rehabilitation of Raw Water Reservoir A	Before announcement of Pre-Qualification (P/Q) (Before September 2021)	WASA-F	Refer to 2-4-1-1
2	Dismantling of Existing Facilities	Before announcement of Pre-Qualification (P/Q) (Before September 2021)	WASA-F	Refer to 2-4-1-2
3	Relocation of WASA-F and FDA Staff	Before signing of G/A (Before February 2021)	WASA-F	Refer to 2-4-1-3
4	Electrical Works	Before announcement of Pre-Qualification (P/Q) (Before September 2021)	WASA-F	Refer to 2-4-1-4

Table 2-63 Expected Due Date of Completion for Obligations of Recipient Country: Works

2-4-1-1 Rehabilitation of Raw Water Reservoir A

As the northwest side wall of Raw Water Reservoir A at the Old JK WTP cracked about 40m as shown in ① of Figure 2-37, the stored water at the Reservoir A leaked. The leaching water nearby the underpass entrance on the adjacent road is considered a leak from the Raw Water Reservoir A (refer to Figure 2) of Figure 2-37).

The cracked sections on the concrete lining surface of the pond slope where the leak is observed have settled to some extent. Although it is not difficult to repair the concrete lining surface of the pond slope, the repair only by means of concrete lining may not stop the leakage completely in case the surrounding area is influenced by settlement. Therefore, it is proposed to backfill 1/3 area of the northeast side of the Raw Water Reservoir A, even though its capacity is reduced. In addition, the water impervious sheet is installed on the bottom of the reservoir, the cost of which is included in PC-1.

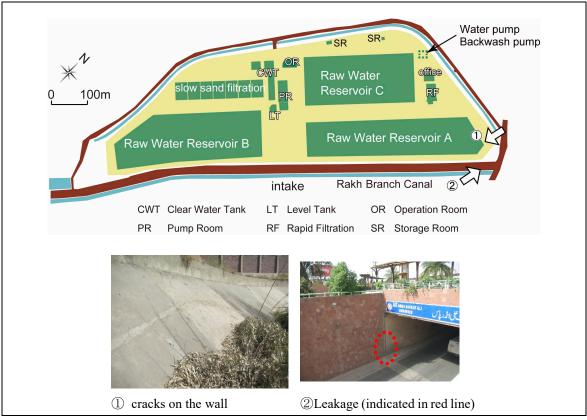


Figure 2-37 Leakage at Raw Water Reservoir A

2-4-1-2 Dismantling of Existing Facilities and Land Leveling

The construction of the WTP and distribution center requires the removal of some of the existing facilities and the land leveling in the sites. The timeframes required to remove the existing structures installed in the Old JK WTP (see Figure 2-38) and the existing OHRs installed in the distribution centers (Abudulah Pur, Madina Town No. 2) (see Figure 2-39, Figure 2-40) are indicated in Table 2-64, including the time required for bidding process. The cost of this dismantling is included in PC-1, which is budgeted and claimed by WASA-F.



Figure 2-38 Dismantling of existing facilities at Old JK WTP

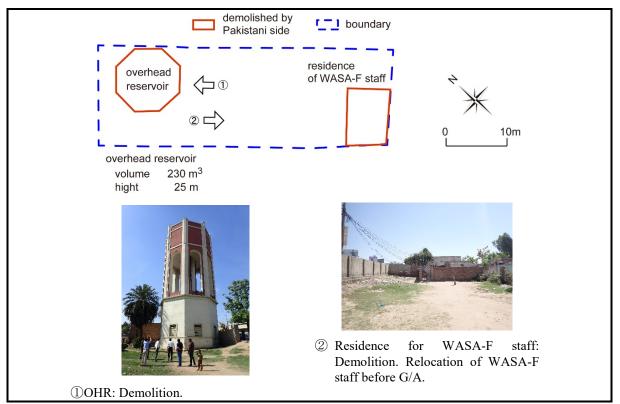


Figure 2-39 Dismantling of existing facilities at Abudulah Pur DC

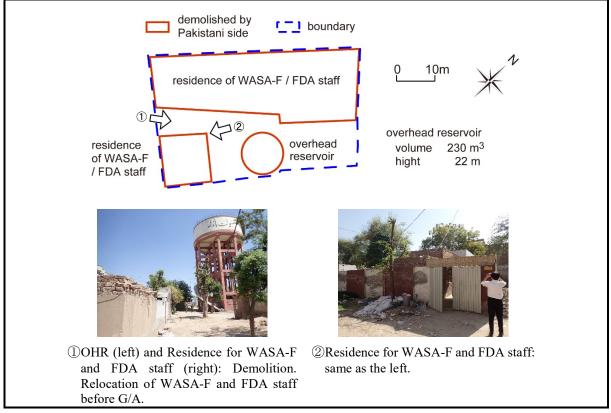


Figure 2-40 Dismantling of existing facilities at Madina Town No. 2 DC

Place	Period of bidding, evaluation and contract for demolition work (Recommended month/year to start the process)	Demolition (months)
Old JK WTP	3 months (February 2021)	2 to 3 months
Distribution centers at Abudulah Pur and Madina Town No. 2	3 months (February 2021)	3 to 4 months

Table 2-64 Expected Months for Demolition of Existing Facilities

2-4-1-3 Relocation of WASA-F and FDA Staff

The staff of WASA-F and FDA residing in the premises of the distribution centers (Abudulah Pur and Madina Town No. 2) (see Figure 2-39, Figure 2-40) should be relocated to another area, of which consensus is made as signing to the M/D on the Explanation on Draft Preparatory Survey Report held on 16th September, 2020 (see Appendix 4 (3)). Table 2-65 and Table 2-66 indicate the list of the staff and residents at the distribution centers to be relocated.

Table 2-65 List of Residents at Abudulah Pur DC

No.	Organization	Designation	No of residents
1. O&M East WASA		Sewerman	4
	Total	4	

Table 2-66 List of Residents at Madina Town No 2 DC

No.	Organization	Designation	No of residents
1.	UD Wing-FDA	DD Admin	7
2.	UD Wing-FDA	Driver	5
3.	UD Wing-FDA	Sub Engineer	4
4.	UD Wing-FDA	Naib Qasid	11
5.	UD Wing-FDA	Sanitary Worker	5
6.	O&M East-WASA	Tracer	9
7.	O&M East-WASA	Sewerman	10
	Total		51

2-4-1-4 Electrical Works

Refer to "2-2-2-7 Electrical Equipment and Instrumentation, (1) Substation Facilities, 4) Responsibility among the Parties Involved".

2-4-2 Obligations of Recipient Country: Administrations

In addition to the works mentioned above, the administrative arrangement and support by the Pakistani side is required. These requirements are presented in Table 2-67 as "Obligations of Recipient Country: Administrations".

_								
No	Item	Contents	Responsibility	Implementation or Due Date for completion				
1	Construction Permission	The following permission for the construction is required. i) Construction for intake and water pipe bridge from Irrigation Department ii) Pipe installation from MC Faisalabad, Communication and Works Department, Pakistan Railways iii) All other necessary permissions from relevant agencies, departments, organizations etc.	WASA-F	Before announcement of Pre-Qualification (PQ)				
2	Banking Arrangement (B/A)	To open a bank account at a bank in Japan for handling the project cost and the payments	WASA-F	Within 1 week after signing of G/A				
3	Project Implementing Unit (PIU)	To establish PIU at WASA-F for implementing the project smoothly	WASA-F	Within 1 month after signing of G/A				
4	Authorization to Pay (A/P)	To issue A/P for the payment to the consultant	WASA-F	Within 1 month after signing of the contract				
5	Tax exemption and customs clearance	 To clear customs and exempt taxes for transported products from out of Pakistan To pay storage fee if charged due to delay of customs clearance and tax exemption To exempt taxes such as those for the procured products, services, internal taxes, and the other taxes 	MEA WASA-F	From signing of G/A to the completion of the project				
6	Project Monitoring Report	i) Result of Detail Designii) Monthly activitiesiii) Activities during entire period of project	WASA-F	 i) Before preparation of bidding documents ii) Every month iii) Within 1 month after issuance of Certificate of Completion for the works under contract 				
7	Environmental Management	ImplementationofEnvironmentalManagementPlan (EMP) and EnvironmentalMonitoring Plan (EMoP)	WASA-F	Designated time under EMP and EMoP in the Project period				

Table 2-67 Obligations of Recipient Country: Administrations

2-5 Project Operation Plan

2-5-1 O&M for Old JK WTP

The Project plans to install a rapid sand filtration process at the Old JK WTP. The process is the same as that for the New JK WTP. The capacity of the filtration process to be newly installed at the Old JK WTP is 5 MGD, which is half the capacity of the New JK WTP. With consideration of the process and the capacity, it is proposed that the Old JK WTP employ approximately three quarters of the staff allocated in the New JK WTP. As an exception, the same number of administrative staff and cleaners is required as those assigned to the New JK WTP since the structures such as administration buildings of the Old JK WTP are planned for the future expansion to manage operations at 10 MGD. Table 2-68 presents the details. For an operation of the upgraded Old JK WTP, additional 33 staff will be required.

		Old JK	Old JK WTP		
Designation/Duty	New JK WTP	Current	after the Project		
Director	1	1	1		
Deputy/Assistant Director	2	2	2		
Operator/Maintenance Engineer	3	1	2		
Process Engineer	1	1	1		
Plant Operator	4		3		
Mechanic / Helper Mechanic	4	9	3		
Electrician / Helper Electrician	4		3		
Laboratory specialist / Assistant	5	-	4		
Plumber / Helper Automation	4	1	3		
Head Clerk	1	1	1		
Accountant	1	1	1		
Cleaner / Sweeper / Gardener / Other	25	_	25		
Individual Consultant	1	-	1		
Total	56	17	50		

Table 2-68 Proposed Number of Staff for Old JK WTP

2-5-2 O&M for Transmission and Distribution Facilities

Although the Project plans to construct the distribution centers expecting 24-hour supply, WASA-F has not experienced 24-hour supply operation in the targeted distribution zone (DZ). Thus, it is necessary to prepare an operation manual for the distribution centers and provide training to the staff. Meanwhile, employment of additional staff is not required for operation of the distribution centers. Pump operators are currently on duty for 24 hours a day.

After the implementation of WASA-F's plan for installing distribution pipelines and the Project, the following tasks of the Water Distribution Maintenance Section (hereinafter referred to as "WDM") will be added:

- To repair leakages due to increased water pressure (maintenance)
- To install connection pipes to new customers for improvements in water supply services (new connection works)
- To install meters for shifting to the metered rate system (meter installation)
- To detect defective meters and to inspect meter accuracy (meter management)
- To manage customer's data using drawings for establishing a meter reading system (drawing preparation).

Due to the increase in the above work, the WDM section needs to increase personnel by two teams with a total of 12 people, led by a Sub Engineer, as presented in Figure 2-41.

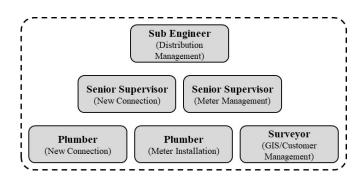


Figure 2-41 Proposed Personnel Structure for Distribution Management

It is also proposed that WASA-F employ another two revenue officers and four meter readers. In the pilot area under the M/P Project, two staff from Revenue and Recovery (R&R) Section were assigned concurrently as the meter readers without additional charge. As the number of customers in the Project site is much more than the one in the pilot area, additional meter readers should be employed.

R&R needs additional staff to reinforce the function to determine the amount of water used and water tariff to be received based on the meter reading record as they handle it manually in unorganized process at present. Proper implementation of the procedures from the meter reading to the tariff confirmation before issuing bills is very important because it helps identify misreading of meters, illegal connections, defective meters and other problems that need to be addressed. For proper implementation, two revenue supervisors and four meter readers shall be employed.

2-5-3 O&M Schedule

Table 2-69 indicates a schedule for O&M of the facilities after the completion of the Project. The

required O&M activities for the WTP were identified with reference to the ones conducted at the New JK WTP. For the transmission and distribution facilities, the data management and an improvement of the customer service are included in addition to regular maintenance of the facilities.

Tasks/Works	Frequency	Note
[Water Treatment Plant]		
Intake Facility		
Intake pump operation	Every day	Operation by instruction of Monitoring/Operation Room
Visual inspection of strainer	Once a day	Cleaning and removal of debris (as required)
Visual inspection of Raw Water Transmission Main	Once a day	Cleaning and removal of floating debris (as required)
Water Treatment		
Checking and recording of dosing rates	Once a day	Coagulant, pre- and post-chlorine,
Visual inspection of dosing	Twice a day	alkaline agent, polymeric agent
Recording of stock/remaining amount of chemicals	Once a day	Same as above chemicals
Visual inspection of water level of tanks/reservoirs	Once a day	Receiving and distribution tank, Mixing tank, Settling tank, Rapid
Cleaning of floating debris	Once a week	sand filter, Clear water reservoir
Visual inspection of floc formation status	Twice a day	
Cleaning of mixing tank and settling tank	Once a year	Every line
Confirmation on sludge extraction	Once a day	
Checking of sand flowing out from rapid sand filter	Once a week	During backwash
Refill of filtration sand	Twice a year	
Rehabilitation of rapid sand filter	Every 10 years	Implementation in rotation
Cleaning of clear water reservoir	Every three years	
Waste water treatment		
Checking of waste water tank	Twice a day	
Operation of sludge collector	Once a week	
Inspection on sludge collector	Once a year	During cleaning of the tank
Water Quality Management		
Water quality analysis and recording	Twice a day	Turbidity, pH, color, residual chlorine, others
Jar test	Once a day	
Preparation of weekly/monthly/annual	As	
reports	scheduled	
Electrical and Mechanical Equipment		
Inspection and recording	Once a day	

Table 2-69 O&M Schedule for Facilities

Tasks/Works	Frequency	Note
Daily cleaning	Once a day	
Inspection of pumps and motors	Once a year	
Inspection of chemical dozing equipment	Once a year	
Inspection of motor operated valve	Once a year	
Inspection of measuring instruments	Once a year	
On-site maintenance and control		
Inspection of the safety device	Once a day	Check defects
On-site cleaning	Every day	As required
On-site security	Every day	Continuously
[Water Transmission and Distribution]		
Operation and recording of pumps	Every day	Operation by instruction of Monitoring/Operation Room
Checking of the volume of water transmitted and distributed, and water pressure	As required	
Confirmation on SCADA data	As required	Countermeasure to value beyond the operational range
Handling of complaints regarding water quality and pressure	As required	
Inspection of butterfly valve	Once a year	
Survey on water pressure distribution	Once a year	
Survey on residual chlorine	Once a year	
Leakage detection	Every day	

2-6 Project Cost Estimation

2-6-1 Initial Cost Estimation

(1) Project Cost borne by the Pakistani Side

The project cost borne by the Pakistani side is 209 million PKR (equivalent to 198 million JPY). Table 2-70 presents the details.

Item	Contents	Cost (million PKR)	Cost (million JPY)	
Bank account, fees	Commissions for Banking Arrangement (B/A) and Authorization to Pay (A/P)	4	4	
Dismantling of Existing Facilities	Dismantling of existing facilities at Old JK WTP and OHRs at Abudulah Pur and Madina Town No. 2	30	28	
Rehabilitation of Raw Water Reservoir A	Rehabilitation of Raw Water Reservoir A at Old JK WTP due to cracks on the sidewall of the reservoir	59	56	
Relocation of Relocation of residents (WASA-F and FDA staff) at distribution centers of Abudulah Pur and Madina Town No. 2		20	19	
Electrical work	Electrical work to bring power cables to Old JK WTP and distribution centers of Abudulah Pur and Madina Town No. 2	22	21	
Processing Cost	Right of way (ROW) /no objection certificate (NOC) for installation in the property of Pakistan Railways and intake construction at RBC, etc.	16	15	
PMU establishment and safety measures	Establishment of unit for project management, provision of security guards as safety measures	57	54	
	Total	209	198	

Table 2-70 Project Cost borne by Pakistani Side

(2) Conditions of Cost Estimation

Table 2-71 presents the conditions of cost estimation.

Item	Contents
Base month for estimation	May 2019
Exchange rate	1 USD=112.12 JPY
	1 PKR =0.949 JPY
	Average rate of three months between February and April 2019

Table 2-71 Conditions of Cost Estimation

2-6-2 Operation and Maintenance Cost

(1) Conditions of Cost Estimation

O&M cost for the Project is composed of 1) personnel cost, 2) chemical cost, 3) electricity cost, 4) maintenance cost, and 5) other operational costs. The conditions of the cost estimation of each item are explained below.

1) Personnel Cost

New staff should be employed based on the staffing plan as discussed in "2-5-1 O&M of Old JK WTP" and "2-5-2 O&M for Transmission and Distribution Facilities". Table 2-72 shows the distribution of the personnel cost of the additional staff for the water treatment plant and distribution centers.

For the analysis of the profit and loss, the personal cost of the proposed additional staff for the Old JK WTP is estimated according to Table 2-68, except for Director and Deputy/Assistant Director. The following are the reasons for assuming the number of additional staff.

- The Director and Deputy/Assistant Director at the New JK WTP have another responsibility at another office, as well as ones at the Old JK WTP. Therefore, Director and Deputy/Assistant Director at the Old JK WTP are not included in the personal cost for the additional staff.
- Since the treatment process is upgraded to the rapid filtration from the slow filtration, there is a difficulty for the current staff at the Old JK WTP to operate the rapid sand filtration. On the other hand, the rapid filtration has been operated at the New JK WTP. Therefore, some staff may be shifted to the Old JK WTP. Thus, not all the staff for the upgraded Old JK WTP may be newly employed.
- It is important that the projection for profit and loss is analyzed on the safe side, especially if there are unknown factors.

【Wat	[Water Treatment Plant]					
	Personnel	Monthly Salary	Nos		Total (PKR)	
1	Operator/Maintenance Engineer	50,000	2	persons	100,000	
2	Process Engineer	50,000	1	person	50,000	
3	Plant Operator	23,000	3	persons	69,000	
4	Laboratory specialist	23,000	2	persons	46,000	
5	Mechanic	23,000	2	persons	46,000	
6	Helper Mechanic	18,000	1	person	18,000	
7	Electrician	23,000	2	persons	46,000	
8	Helper Electrician	18,000	1	person	18,000	
9	Helper Automation	18,000	1	person	18,000	
10	Laboratory Assistant	16,000	2	persons	32,000	
11	Head Clerk	23,000	1	person	23,000	
12	Accountant	23,000	1	person	23,000	
13	Cleaner/Sweeper	16,000	6	persons	96,000	
14	Store Keeper	18,000	1	person	18,000	
15	Store Keeper labour	16,000	6	persons	96,000	
16	Plumber	16,000	2	persons	32,000	
17	Gardener	16,000	12	persons	192,000	
18	Individial Consultant	100,000	1	person	100,000	
	Total/Month				1,023,000	
	Total/Year				12,276,000	

Table 2-72 Personnel Cost for the Proposed Additional Staff

[Distribution Centre]

	Personnel	Monthly Salary	Nos		Total (PKR)
1	Sub Engineer	17,000	2	Persons	34,000
2	Supervisor	14,500	4	Persons	58,000
3	Plumber/fitter	14,500	4	Persons	58,000
4	Surveyor	12,500	2	Persons	25,000
5	Revenue Officer	20,500	2	Persons	41,000
6	Meter Reader	13,000	4	Persons	52,000
	Total/Month	1			268,000
	Total/Yea	ſ			3,216,000

2) Chemical Cost

The chemical cost based on the unit purification volume is estimated at 2.54 PKR/m³ as shown in Table 2-73. This estimate is based on the annual budget of the chemical cost for New JK WTP in 2019.

Table 2-73	Chemical Cost	(Budget Estimated for NEW JK WTP, 2019)

Chemical Cost Budgeted	42,150,000 PKR
Treated Water / Year	16,607,500 m3
Chemical Cost / m3	2.54 PKR/m3

Source: WASA-F

3) Electricity Cost

Power consumption at the WTP and distribution centers is estimated as indicated in Table 2-74. This estimate is based on the planned volume of treated and distributed water and the specifications of each

equipment. The unit cost of electricity is approximately 24.9 PKR/kWh, which is the rate for commercial use.

Year	2024		2033		2038	
Water transmission(m3/day)	12,390		19,420		20,450	
Water Intake(m3/day)	13,040		20,440		21,530	
eatment Plant						
Raw Water Pump	550	kWh/D	861	kWh/D	907	kWh/D
Clear Water Pump	1,651	kWh/D	2,583	kWh/D	2,722	kWh/D
Backwash Pump	4	kWh/D	4	kWh/D	4	kWh/D
Air Blower	26	kWh/D	26	kWh/D	26	kWh/D
Sludge Extraction Pump	39	kWh/D	39	kWh/D	39	kWh/D
stribution Centre						
Lifting Pump_DC-1	510	kWh/D	800	kWh/D	844	kWh/D
Lifting Pump_DC-2	982	kWh/D	1,548	kWh/D	1,629	kWh/D
1	Total 3,762	kWh/D	5,861	kWh/D	6,171	kWh/D

Table 2-74 Volume of Electricity

4) Maintenance Cost

With reference to the annual maintenance budget for the New JK WTP in 2019, the maintenance cost (replacement of spare parts) based on the unit purification volume is estimated at 229.0 PKR/m³/year.

The replacement years of each equipment in general is presented in Table 2-75. However, the periodical inspection with maintenance will extend the life span of the equipment.

ItemReplacement YearRemarksElectrical equipment15 YearsGeneratorPump facility15 YearsChemical dosage equipment15 YearsMeters10 YearsFlow meter, pressure gauge, water quality meter

Table 2-75 Replacement Year of Equipment

5) Other Operational Costs

Other operating costs, such as those for the internet, office supplies, security guards, security camera, trucks to transport sludge disposal, etc., are estimated at 5.148 million PKR/year. This estimate is 75% of the annual budget of the New JK WTP.

(2) O&M Cost

Based on the conditions explained above, the O&M cost for the Old JK WTP is estimated as presented in Table 2-76.

Year		2024	2025	2026	2027	2028	2033	2038
Production / Consumption								
ltem	Unit							
Water Distribution	m3 /day	12,390	13,190	13,990	14,800	15,620	19,420	20,450
Water Intake	m3 /day	13,040	13,880	14,730	15,580	16,440	20,440	21,530
Power Consumption	kWh/day	3,762	3,997	4,245	4,479	4,731	5,861	6,171
Expenditure for Operation a	nd Maintena	nce						
Item	Unit							
Personnel Cost	PKR /yr	15,492,000	15,492,000	15,492,000	15,492,000	15,492,000	15,492,000	15,492,000
Power Consumption	PKR /yr	34,175,146	36,309,957	38,562,864	40,688,591	42,977,835	53,243,097	56,059,231
Chemical Cost	PKR /yr	12,089,384	12,868,148	13,656,183	14,444,218	15,241,524	18,949,924	19,960,463
Other Operational Cost	PKR /yr	5,148,000	5,148,000	5,148,000	5,148,000	5,148,000	5,148,000	5,148,000
Repair and Maintenance	PKR /yr	2,837,310	3,020,510	3,203,710	3,389,200	3,576,980	4,447,180	4,683,050
OM Cost in Total	PKR /yr	69,741,840	72,838,615	76,062,757	79,162,009	82,436,339	97,280,201	101,342,744

Table 2-76Estimated O&M Cost

As the result of estimation, the total O&M cost is 70 million PKR in 2024 and 101 million PKR in 2038.

(3) Income by Water Sales

According to the database of WASA-F, the actual unit price of water is 8.4 PKR/m³ and 17.7 PKR/m³ for domestic and non-domestic (commercial and industrial) uses, respectively. WASA-F has a plan to increase the tariff to 3.375 times the current rate by 2023. As a result, the tariff will be 28.35 PKR/m³ for the domestic water supply and 59.74 PKR/m³ for the non-domestic use.

The revenue from water sales is estimated based on the revised water tariff and at the different collection rates of 40%, 45%, and 50%. Table 2-77 presents the results of the estimate. With the collection rate at 45%, the total revenue from water bills is estimated to increase to 72 million PKR in 2024, the year of completion of the facilities, and 127 million PKR in 2038.

	Year ##		2024	2025	2026	2027	2028	2033	203
Nater Supply									
Item									
Water Supply	m3	/day	12,390	13,190	13,990	14,800	15,620	19,420	20,45
Domestic	m3	/day	9,600	9,920	10,250	10,580	10,930	13,590	14,31
Non Domesti	c m3	/day	2,790	3,270	3,740	4,220	4,690	5,830	6,14
Water Fee									
Item									
Domestic	PKR	/m3	28.35	28.35	28.35	28.35	28.35	28.35	28.3
Non Domestic	PKR	/m3	59.74	59.74	59.74	59.74	59.74	59.74	59.74
Sales Revenue	[Collection F	Rate】	50%						
Item	ltem								
Total Sales Re	evenue PKR	/Yr	80,087,315	86,976,179	93,807,756	100,748,359	107,683,413	133,874,828	140,979,808
Domestic	PKR	/Yr	49,669,200	51,324,840	53,032,219	54,739,598	56,550,454	70,312,961	74,038,153
Non Domestic	PKR	/Yr	30,418,115	35,651,339	40,775,537	46,008,761	51,132,960	63,561,867	66,941,65
Sales Revenue	[Collection F	Rate】	45%						
Item	ltem								
Total Sales Re	evenue PKR	/Yr	72,078,583	78,278,561	84,426,980	90,673,523	96,915,072	120,487,345	126,881,827
Domestic	PKR	/Yr	44,702,280	46,192,356	47,728,997	49,265,638	50,895,408	63,281,665	66,634,336
Non Domestic	PKR	/Yr	27,376,303	32,086,205	36,697,983	41,407,885	46,019,664	57,205,680	60,247,493
Sales Revenue	[Collection F	Rate】	40%						
Item	ltem								
Total Sales Re	evenue PKR	/Yr	64,069,852	69,580,943	75,046,205	80,598,687	86,146,731	107,099,862	112,783,847
Domestic	PKR	/Yr	39,735,360	41,059,872	42,425,775	43,791,678	45,240,363	56,250,369	59,230,522
Non Domestic	PKR	/Yr	24,334,492	28,521,071	32,620,430	36,807,009	40,906,368	50,849,493	53,553,326
	1 1 1 1 1	,	2.,001,102	20,021,011	52,520,100	00,001,000		33,515,150	55,000,01

Table 2-77Income by Water Sales

(4) Profit and Loss Projection

Based on the estimated O&M cost and income from water sales described above, the operating profit and loss projection is provided in Table 2-78. This projection has been prepared with an assumption of tariff revision and the collection rates of 40%, 45%, and 50%. A net profit will be generated from 2024 with a collection rate of 45% or more. The current collection rate is 62%. Therefore, the Project is considered as highly feasible to be operated by WASA-F. If the tariff is not revised, the income with a collection rate of 100% will not exceed the estimated O&M. In that case, as well as the present situation, the O&M cost is expected to be subsidized by the provincial government.

Year	r		2024	2025	2026	2027	2028	2033	2038
	tion Ra	ate]	50%						
Income	PKR	/Yr	80,087,315	86,976,179	93,807,756	100,748,359	107,683,413	133,874,828	140,979,808
Domestic	PKR	/Yr	49,669,200	51,324,840	53,032,219	54,739,598	56,550,454	70,312,961	74,038,151
Non Domestic	PKR	/Yr	30,418,115	35,651,339	40,775,537	46,008,761	51,132,960	63,561,867	66,941,657
Expenditure	PKR	/Yr	69,741,840	72,838,615	76,062,757	79,162,009	82,436,339	97,280,201	101,342,744
Net Revenue			10,345,474	14,137,563	17,744,999	21,586,350	25,247,074	36,594,627	39,637,065
Year	r		2024	2025	2026	2027	2028	2033	2038
[Collect		ate]	45%	2020	2020	2021	2020	2000	2000
Income	PKR	/Yr	72,078,583	78,278,561	84,426,980	90,673,523	96,915,072	120,487,345	126,881,827
Domestic	PKR	/Yr	44,702,280	46,192,356	47,728,997	49,265,638	50,895,408	63,281,665	66,634,336
Non Domestic	PKR	/Yr	27,376,303	32,086,205	36,697,983	41,407,885	46,019,664	57,205,680	60,247,491
Expenditure	PKR	/Yr	69,741,840	72,838,615	76,062,757	79,162,009	82,436,339	97,280,201	101,342,744
Net Revenue			2,336,743	5,439,946	8,364,223	11,511,514	14,478,733	23,207,144	25,539,084
Year	r		2024	2025	2026	2027	2028	2033	2038
[Collect	tion Ra	ate]	40%						
Income	PKR	/Yr	64,069,852	69,580,943	75,046,205	80,598,687	86,146,731	107,099,862	112,783,847
Domestic	PKR	/Yr	39,735,360	41,059,872	42,425,775	43,791,678	45,240,363	56,250,369	59,230,521
Non Domestic	PKR	/Yr	24,334,492	28,521,071	32,620,430	36,807,009	40,906,368	50,849,493	53,553,326
Expenditure	PKR	/Yr	69,741,840	72,838,615	76,062,757	79,162,009	82,436,339	97,280,201	101,342,744
Net Revenue			-5,671,988	-3,257,672	-1,016,553	1,436,678	3,710,391	9,819,661	11,441,103

Table 2-78	Profit and Loss Statement (Projection)

CHAPTER 3 PROJECT EVALUATION

Chapter 3 Project Evaluation

3-1 Preconditions

It is required that, as a prerequisite for the implementation of the Project, the government of Pakistan properly undertakes the items described in "2-4 Obligations of the Recipient Country". The followings are major items for the obligation.

Rehabilitation of Raw Water Reservoir A

Water leakage occurred due to cracks on the wall of the Raw Water Reservoir A in the Old JK WTP. The Pakistani side should rehabilitate the reservoir to stop the leakage.

Dismantling and ground levelling of Existing Facilities

There are existing facilities where WTP, OHR, and GR are to be constructed in the Project. The Pakistani side should dismantle these facilities prior to the construction. After the dismantlement, the site shall be prepared as the construction site of the Project including such works as clearance of the wastes from the dismantlement, levelling of the ground, etc.

Relocation of Residences

WASA-F staff and FDA staff presently residing at distribution centers of Abudulah Pur and Madina Town No. 2 where OHR and GR are constructed are required to relocate themselves. The Pakistani side takes responsibility for their relocation.

3-2 Necessary Inputs by Recipient Country

Inputs to be borne by the recipient country are as follows:

(1) Increase in the number of O&M staff at Old JK WTP

As mentioned in "2-5 Project Operation Plan", the Project upgrades the slow sand filtration of the Old JK WTP with the capacity of 3.5 MGD to a rapid sand filtration system with a treatment capacity of 5 MGD. In order to manage the upgraded WTP, the number of O&M staff shall be increased from 17 to 50. The Project includes the provision of technical assistance, called "soft component program" for the O&M of the WTP. Therefore, the required number of staff shall be employed before the commencement of operation of the WTP (i.e. before the completion of construction).

(2) Continuous employment of staff trained through Soft Component

The staff operating and maintaining the facilities of WTP and the distribution centers will obtain the necessary technical skills through the technical assistance under the soft component program. Due to

a limited number of O&M staff for these facilities in Pakistan, these trained staff shall be kept employed on a continuous manner.

3-3 Important Assumption

There are some important assumptions for the realization of the project benefits in a sustainable manner. These assumptions are listed as follows:

- Natural disasters with serious damages will not occur.
- Social and economic conditions will not be deteriorated to the extent that disables the operation of the facilities.
- The future population and water demand projection in the project area will not be significantly different from the expectation.
- Rakh Branch Canal, the intake source of Old JK WTP, will receive water from Chenab River continuously except for the maintenance period of the canal.

3-4 Project Evaluation

3-4-1 Relevance

The project will be rated as "highly relevant" with the reasons described as follows:

Beneficiaries

The beneficiaries of the project are the residents that receive WASA-F's water service. The service population of the Project area (Abudulah Pur and Madina Town No. 2) is expected to be increased due to the Project from around 30,000 in 2018 to around 79,000 in 2038.

After the implementation of the project, water from the existing source will no more be required for the supply to the Project area. As a result, a certain amount of water currently supplied to the Project area will be available for utilization by WASA-F' customers of 130 million (Year 2018) residing in the other district. Therefore, the population of 130 million is also benefited by the surplus.

Urgency

It is expected that the amount of water demand will exceed the supply in 2021 due to rapid population increase in the supply area. In order to address this issue, the development of safe and stable water supply facilities such as water treatment plants and pipe network under an appropriate plan is an urgent priority.

Relevance to Overall Goal

The National Water Policy 2018 states that the provision of safe drinking water to the urban and rural population in the country is a key issue. The project site is located in the service area of WASA-F, where the water is supplied on a daily basis. However, the service is not satisfactory due to the intermittent supply and the low distribution pressure as well as an increase in water demand day by day. Thus, water shortages are expected to occur as the water demand exceeds the supplying capacity of WASA-F in 2021. The facilities such as WTP, transmission and distribution mains, and DC (GR, OHR) to be constructed under the Project enables the continuous provision of safe water in the area. Therefore, it is considered that the Project is consistent with Pakistan's water policy.

Relevance to Japan's Assistance Policy

One of the priority issues identified in Japan's Country Development Cooperation Policy for Pakistan (February 2018) is the realization of human security and the improvement of social infrastructure. The policy focuses on developing the infrastructure and O&M models including collection fee for water supply and sewerage sector of the urban area.

In addition, JICA Country Analysis Paper for Pakistan (October 2014) maintains that development of water supply and sewerage facility is important in major cities. Therefore, the Project is consistent with the Japan's assistance policy and analysis.

3-4-2 Effectiveness

Through this Project, the production of the WTP will be increased due to renewal and expansion of the facilities. In addition, the pressure of the distribution will be increased through the development of transmission/distribution facilities. Through the development, the effectiveness of the project is expected as follows.

(1) Quantitative Effects

Table 3-1 presents the expected quantitative effects through renewing and expanding the Old JK WTP and installation of transmission and distribution facilities.

Indicator	Baseline data (Year 2020)	Target (Year 2027)
indicator	Buseline data (Tear 2020)	(3 years after project completion)
Production volume by WTP ^{*1}	6,800 m ³ /day	14,800 m ³ /day
Distribution	approximately 0 - 8 m	25 m or higher*3
pressure	(average: 1.7 m) *2	25 m or nigher ^e

Table 3-1 Quantitative Effects

Note:

*1: Average of production volume by WTP excluding closing period of RBC approximately for 3 weeks per year

*2: Average of maximum pressure at tap surveyed in 2019-20

*3: Measurement at flowmeter room of OHR

The production volume by the WTP in the above Table represents the production volume of the Old JK WTP. The target value of 14,800 m³/day on the production volume by WTP is the estimated daily average demand for Abudulah Pur and Madina Town No. 2 listed in Table 2-16. Regarding the distribution pressure, the pressure at tap is used as a baseline value for the distribution pressure, because of the difficulty to measure the distribution pressure at the existing facilities. The baseline distribution pressures were measured at 36 taps in 2019-20 and the survey details are indicated in Appendix 7 (1). The target value of the distribution pressure is represented by the pressure value of the distribution measured at the flowmeter room of OHR.

(2) Qualitative Effects

The following is the expected qualitative effects in the Project.

- Improvement of living environment and public health for citizens, and contribution in promoting infection control measures by improving water supply service quality such as water supply hours
- Improvement of WASA-F's financial status by increasing customers and the income through water tariff

APPENDICES

[Appendices]

1.	Member List of the Study Team	App 1–1
2.	Study Schedule	App 2–1
3.	List of Parties Concerned in the Recipient Country	App 3–1
4.	Minutes of Discussions	
	(1) Minutes of Discussions on the First Survey in Pakistan	App 4(1)–1
	(2) Technical Note on the First Survey in Pakistan	App 4(2)–1
	(3) Minutes of Discussions: Explanation on Draft Preparatory Survey Report	App 4(3)–1
5.	Soft Component (Technical Assistance) Plan	App 5–1
6.	Other Relevant Data	
	(1) Background of M/P Project and Outline of Formulated Plan	App 6(1)–1
	(2) Letter on Pipeline Installation Route from Relevant Authorities	App 6(2)–1
	(3) Letter on Construction Permission of Intake Mouth and Pipe Bridge	App 6(3)–1
	(4) Scope of the Distribution Mains by the Pakistani Side	App 6(4)–1
	(5) Procurement and Installation Technique for Water Meter	App 6(5)–1
	(6) Project Monitoring Report	App 6(6)–1
7.	References	
	(1) Water Pressure Records on Water Service Pipes	App 7(1)–1
	(2) Results on Geotechnical Survey	App 7(2)–1
	(3) Results on Excavation and Underground Infrastructure Observation Survey	App 7(3)–1
	(4) Preliminary Design	App 7(4)–1
	(5) Outline Design Drawing	App 7(5)–1

Appendix 1 Member List of the Study Team

Appendix 1 Member List of the Study Team

Name	Title	Organization
JICA Officials		
Mr. Yuki Aratsu	Team Leader	Senior Assistant Director Global Environment Department JICA
Mr. Hironobu Nakayama	Cooperation Planning	Technical Advisor Water Resources Team 1 Water Resources Group Global Environment Department JICA
Consultant Team	-	-
Mr. Nobuyuki Sato	Project Manager / Water Supply Plan 1	Japan Techno Co.,Ltd.
Mr. Tatsuya Terai	Deputy Project Manager / Water Supply Plan 2 / Water Resource / Natural Condition Survey	Nihon Suiko Sekkei Co.,Ltd.
Mr. Takeshi Sakai	Facility Plan and Design of Transmission and Distribution Pipeline, and Reservoir	Nihon Suido Consultants Co.,Ltd.
Mr. Hideharu Kikuchi	Facility Plan and Design of Intake, Water Conveyance, and Water Treatment Plant	Nihon Suido Consultants Co.,Ltd.
Mr. Ken Yokoyama	Operation and Maintenance	Yokohama Water Co., Ltd.
Mr. Changnam Lee	Electrical and Mechanical Facility Design	Nihon Suiko Sekkei Co.,Ltd.
Mr. Takashi Nakagawa	Civil Works and Construction Plan / Procurement / Cost Estimate / Safety Plan	Japan Techno Co.,Ltd.
Mr. Shinta Segawa	Financial and Business Management	Yokohama Water Co., Ltd.
Ms. Kiyoko Takamizawa	Environmental and Social Considerations	Japan Techno Co.,Ltd.
Mr. Itsuro Matsubara	Verification	Japan Techno Co.,Ltd.

Appendix 2 Study Schedule

Appendix 2 Study Schedule

Date		Main Activities
24th March, 2019	Sun	Arrival in Pakistan from Japan
25th March, 2019	Mon	Moving to Faisalabad from Lahore, Internal meeting between JICA Officials and
		Consultant Team
26th March, 2019	Tue	Meeting with WASA-F and FDA, field visit
27th March, 2019	Wed	Moving to Lahore from Faisalabad
28th March, 2019	Thu	Meeting with HUD&PHED and P&D
29th March, 2019	Fri	Signing of Minutes
30th March, 2019	Sat	Moving to Islamabad from Lahore
31st March, 2019	Sun	Document preparation
1st April, 2019	Mon	Report to Embassy of Japan and JICA Pakistan Office, Meeting with EAD
2nd April, 2019	Tue	JICA Officials: Leaving for Japan

Schedule for First Survey in Pakistan	(JICA Officials and Consultant Team)
Schedule for Thist Survey in Takistan	(JICH Officials and Consultant Team)

Schedule for First Survey in Pakistan (Consultant Team)

Date		Main Activities
3rd April, 2019	Wed	Field survey for facilities and pipeline, review of sub-contract surveys
4th April, 2019	Thu	Field survey for facilities and pipeline, collection of water source and meteorological
		data
5th April, 2019	Fri	Collection of water source and meteorological data, study on EIA process, study on
		electrical equipment
8th April, 2019	Mon	Meeting with HUD&PHED and EPA, preparation of contract for sub-contract survey,
		study on electrical equipment
9th April, 2019	Tue	Field survey for facilities and pipeline, study on facilities design, study on budget in
		water sector, preparation of contract for sub-contract survey, study on electrical
		equipment
10th April, 2019	Wed	Field survey for facilities and pipeline, study on facilities design, bid price evaluation
		for sub-contract survey, study on electrical equipment
11th April, 2019	Thu	Field survey for facilities and pipeline, study on facilities design, contract negotiation
		for sub-contract survey, study on mechanical equipment
12th April, 2019	Fri	Field survey for facilities and pipeline, study on facilities design, contract negotiation
		for sub-contract survey, study on electrical equipment
15th April, 2019	Mon	Field survey for facilities and pipeline, study on facilities design, preparation for
		excavation survey
16th April, 2019	Tue	Field survey for facilities, preparation for excavation survey, study on mechanical and
		electrical equipment
17th April, 2019	Wed	Meeting with AFD, field survey for facilities, preparation for excavation survey, study

Date		Main Activities
		on water service
18th April, 2019	Thu	Field explanation to sub-contractor, study on mechanical and electrical equipment,
		data collection for financial analysis
19th April, 2019	Fri	Field survey for facilities, survey for telecommunication, data collection for water
		tariff and meter
22nd April, 2019	Mon	Meeting with EPA, document preparation for meeting, preparation for excavation
		survey, study on O&M manual for New JK WTP, study on mechanical and electrical
		equipment, data collection for cost estimate and financial analysis
23rd April, 2019	Tue	Meeting with WASA-F, document preparation for meeting, preparation for excavation
		survey, analysis on operational data of New JK WTP, data collection for financial
		analysis
24th April, 2019	Wed	Document preparation for meeting, field survey for water meter installation,
		preparation for excavation survey, study on filter media, study on financial status
25th April, 2019	Thu	Document preparation for meeting, meeting with Irrigation Department, study on cost
		of chemicals, data collection for cost estimate and meter procurement
26th April, 2019	Fri	Pre-meeting for Technical Note, analysis on operational data of New JK WTP, data
		collection for cost estimate and meter procurement, discussion about environmental
		and social survey
27th April, 2019	Sat	Meeting on Technical Note
29th April, 2019	Mon	Preparation of presentation slides for the first survey in Pakistan after returning to
		Japan, field survey for facilities, data collection for cost estimate, meeting with EPA
30th April, 2019	Tue	Preparation of presentation slides for the first survey in Pakistan after returning to
		Japan, field survey for pipeline, data collection for cost estimate
1st May, 2019	Wed	Preparation of presentation slides for the first survey in Pakistan after returning to
		Japan and report
2nd May, 2019	Thu	Preparation for report on the first survey in Pakistan
3rd May, 2019	Fri	Preparation for report on the first survey in Pakistan
6th May, 2019	Mon	Preparation for report on the first survey in Pakistan
7th May, 2019	Tue	Preparation for report on the first survey in Pakistan
8th May, 2019	Wed	Preparation for report on the first survey in Pakistan
9th May, 2019	Thu	Leaving for Japan
-		·

Schedule for Second Survey in Pakistan (Consultant Team)

Date		Main Activities
14th July, 2019	Sun	Arrival in Pakistan from Japan
15th July, 2019	Mon	Review and discussion on excavation and topographic surveys
16th July, 2019	Tue	Planning of settlement test

Date		Main Activities
17th July, 2019	Wed	Meeting with WASA-F
18th July, 2019	Thu	Review and discussion on excavation and topographic surveys
19th July, 2019	Fri	Review and discussion on excavation survey
22nd July, 2019	Mon	Leaving for Japan

Schedule for Third Survey in Pakistan (Consultant Team)

Date		Main Activities
12th Dec, 2019	Thu	Arrival in Pakistan from Japan
13th Dec, 2019	Fri	Meeting with HUD&PHED
14th Dec, 2019	Sat	Stakeholder meeting
16th Dec, 2019	Mon	Field survey for facilities
17th Dec, 2019	Tue	Field survey for facilities
18th Dec, 2019	Wed	Field survey for facilities
19th Dec, 2019	Thu	Field survey for facilities
20th Dec, 2019	Fri	Leaving for Japan

Schedule for Fourth Survey in Pakistan (by online) (JICA Officials and Consultant Team)

Date		Main Activities
14th Sep, 2020	Mon	Meeting with WASA-F
15th Sep, 2020	Tue	Meeting with WASA-F
16th Sep, 2020	Wed	Meeting with P&D, HUD&PHED, FDA, and WASA-F, Signing of Minutes

Appendix 3

List of Parties Concerned in the Recipient Country

Appendix 3 List of Parties Concerned in the Recipient Country

Planning and Development Board (P&D)

Mr. Habib Ur Rehman Gillani, Chairman

- Mr. Naveed Ahmed Chaudhry, Member, Social Infrastructure & Environment
- Mr. Yasir Mubeen, Chief of the Section, Social Infrastructure & Environment

Housing, Urban Development & Public Health Engineering Department (HUD&PHED) Mr. Salman Yusuf, Additional Secretary Mr. Muazzam Jamil Malik, Deputy Secretary

WASA Faisalabad

Mr. Faqir Muhammad Chaudhry, Managing Director

Mr. Jabbar Anwar Chauhdry, Managing Director

Mr. Adnan Nisar, DMD Engineering

Mr. Ghulam Shabbir, Director (P&D)

Mr. Muhammad Rafi, Director Planning & Design

Mr. Saqib Raza, Director Water Distribution

- Mr. Asad Ali, Deputy Director FF
- Ms. Hina Saleem, Deputy Director, I&C

Faisalabad Development Authority (FDA) Mr. Aamer Aziz, Director General

<u>Irrigation Department</u> Mr. Muzafar Khan, Executive Engineer, LCC West Mr. Saleem Bhatti, Superintendent Engineer, LCC East

Environment Protection Department (EPD) Mr. Naaseem UR. Rehman, Director EIA Mr. Noor Ahmed, Deputy Director EIA Mr. Arif Mehmood Assistant Director, Faisalabad

Appendix 4 Minutes of Discussions

Appendix4 Minutes of Discussions

ŧ)

(1) Minutes of Discussions on the First Survey in Pakistan

Minutes of Discussions on the Preparatory Survey for the Project for Improvement of Water Treatment Plant and Water Distribution System in Faisalabad

Lahore, 29th March, 2019

Based on the several preliminary discussions between the Government of Islamic Republic of Pakistan (hereinafter referred to as "Pakistan"), Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Project for Improvement of Water Treatment Plant and Water Distribution System in Faisalabad, (hereinafter referred to as "the Project") to Pakistan. The Team held a series of discussions with the officials of the Government of Pakistan and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Mr. Yuki Aratsu Mr/Faqir Muhammad Chaudhry Mr. Aamer Aziz Managing Director Director General Leader Faisalabad Development Authority of EAD and Preparatory Survey Team Water and Sanitation Agency, of completest Autori ject to approval Japan International Cooperation Agency Gout of Punjab. Mr. Iftikhar Ali Sahoo Mr. Salman Yusuf Mr. Syed Mujtaba Hussain 25.08.200 Additional Secretary (Technical) Secretary Joint Secretary Housing Urban Development and Public Planning and Development Department, Economic Affairs Division, Health Engineering Department, Government of Punjab Government of Pakistan Syeda Adeela Bokhari Government of Punjab Joint Secretary

John Secretary Economic Affairs Division Government of Pakistan Islamabad

App 4(1)-1

ATTACHMENT

1. Objective of the Project

The objective of the Project is to upgrade the water supply system through renewal of the Original Jhal Khanuana Water Treatment Plant and rehabilitation of the water distribution network for the water supply service area, thereby contributing to improvement of water supply system in Faisalabad City.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Improvement of Water Treatment Plant and Water Distribution System in Faisalabad".

3. Project site

Both sides agreed that the site of the Project is in Faisalabad, which is shown in Annex 1.

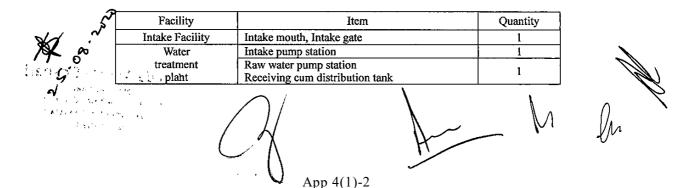
4. Responsible authority for the Project

Both sides confirmed that the authorities responsible for the Project are as follows:

- 4-1. The Water and Sanitation Agency, Faisalabad (hereinafter referred to as "WASA-F") will be the implementing agency. The organization charts are shown in **Annex 2**.
- 4-2. The Housing Urban Development and Public Health Engineering Department, Government of Punjab (hereinafter referred to as "HUD&PHED") will be the responsible agency. HUD&PHED shall be responsible for necessary support of the implementation.

5. Items requested by the Government of Pakistan

As a result of discussions, both sides confirmed that the items requested by the Government of Pakistan are as follows:



(22,700m3/d)	Flash mixing tank	
1	Flocculation tank	1
	Settling tank	
	Rapid sand filter	1
	Clear water reservoir cum pump station	1
	Submerged mixer	
	Waste water transfer pump	
	Waste water tank	
	Recycling pump	1
	Sludge Thickener	
	Sludge extraction pump house	
	Sludge drying bed	
	Chlorination unit	
	Lime unit	1 1
	Alum unit	
	Polymer unit	
	Administration building	1
Distribution	Ground reservoir	2
centers	Overhead reservoir	2
Distribution	Transmission main pipe	About 4km
Distribution	Primary main pipe	A h aut 201
network	Secondary main pipe	About 32km

- 5-1. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.
- 5-2. The Government of Pakistan shall submit an official request to the Government of Japan through a diplomatic channel before September 2019 by Economic Affairs Division after the concept clearance of the Project by CDWP.
- $(1+1)^{-1} = \frac{1}{2} \left(\frac{1}{2} \right)^{-1} = \frac$

ų,

6. Procedures and Basic Principles of Japanese Grant

- 6-1. Pakistani side confirmed that the procedures and basic principles of Japanese Grant as described in Annex 3 shall be applied to the Project.As for the monitoring of the implementation of the Project, JICA requested the Pakistani side to submit the Project Monitoring Report that the form is attached as Annex 4.
- 6-2. Pakistani side agreed to take the necessary measures, as described in Annex 5 "Major Undertakings to be taken by Pakistan", for smooth implementation of the Project. The contents of the Annex 5 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report.

The contents of Annex 5 will finally be used as an attachment to the Grant Agreement. \bigcirc

App 4(1)=3.08.2020

7. Schedule of the Survey

7-1. The Team will proceed with further survey in Pakistan until March, 2020.

- 7-2. The official request to the Government of Japan shall be submitted before September, 2019 by Economic Affairs Division after the concept clearance of the Project by CDWP.
- 7-3. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Pakistan in order to explain its contents around December, 2019.
- 7-4. If the contents of the draft Preparatory Survey Report are accepted and the undertakings for the Project are fully agreed by Pakistani side, JICA will finalize the Preparatory Survey Report and send it to Pakistan around March, 2020.

T					20)19							2020		
Tentative Schedule	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
Undertakings to be taken b	y Jap	an sic	de												
Outline Design Survey															
Work in Japan															
Explanation of the draft Preparatory Survey Report										-					
Provision of necessary information for PC-1															
Submission of the Preparatory Survey Report															
Undertakings to be taken b	y Pal	istan	side												
Submission of official request															
Development of PC-1 (Final)															
Approval by PDWP]		
Approval by CDWP			1							1					
Approval by ECNEC															

7-5. The following schedule is tentative and subject to change.

7-6. Pakistani side explained that WASA-F shall prepare Planning Comission-1 (PC-I) and arrange approval from Executive Committee of National Economic Council (ECNEC), the Government of Pakistan by the end of April, 2020. Pakistani side agreed to take necessary procedures to secure its approval as above schedule.

8. Environmental and Social Considerations

- 8-1. Pakistani side confirmed to give due environmental and social considerations during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).
- 8-2. The Project is categorized as "B" under the Guidelines from the following considerations:

The Project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors, and its potential adverse impacts on the environment are not likely to be significant.

Pakistani side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact Assessment (EIA) /Initial Environmental Examination (IEE) and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the Environmental Protection Agency (EPA) and submitted to JICA by the final approval of PC-1.

9. Other Relevant Issues

9-1. Security Arrangement

Pakistani side shall take all possible and necessary measures to ensure the safety of concerned Japanese and other foreign persons during the Survey and during the implementation of the Project, whenever Japanese side requests in advance.

9-2. Water Right

The Team confirmed that WASA-F had water right of 20 cusec from Rakh Branch Canal in accordance with the agreement signed with Irrigation Department in July, 2018 (Annex 6).

9-3. Investigation of intake facility

The Team explained that investigation on the capacity of existing intake facility is essential in the Outline Design Survey in order to examine whether the capacity is enough for renewed Jhal Khanuana water treatment plant and the necessity of construction of a new intake facility for the Project. Both sides agreed that WASA-F shall get approval of re-construction by December 2019, if necessary, in the case the new facility is found to be required for the Project.

·03·) App 4(1)-

9-4. Investigation of underground facilities during Preparatory Survey

The Team mentioned that investigation of existing underground facilities is necessary for design of the Project. WASA-F agreed to get necessary approval from the administrator of the road.

9-5. Water supply plan during the canal closing period

The water from Rakh Branch Canal will not be utilized for renewed Jhal Khanuana water treatment plant during the canal closing period (about 3 weeks in a year on average). Both sides agreed that alternatives to supply water continuously to the Project area, such as connecting the existing Arterial Main to the transmission pipe or the clear water reservoir should be examined through the Outline Design Survey.

9-6. Resettlement of WASA officials

Both sides confirmed that some WASA-F officials are living around existing 2 overhead reservoirs which should be demolished under the Project. WASA-F explained that WASA-F are planning to provide them with new residences in other locations and resettle them. Both sides agreed that WASA-F shall take due procedures for the resettlement in comply with the laws of Pakistan. Both sides also agreed that WASA-F shall complete the resettlement as per Government laws before the signing of the Grant Agreement.

9-7. Backfilling and consolidation of the existing facilities

 $\boldsymbol{\varTheta}$

The Team requested that the following actions shall be taken by Pakistani side prior to the notice of the bidding, which is expected to be July, 2021. Pakistani side agreed on it.

- To backfill and consolidate the existing raw water storage tank B

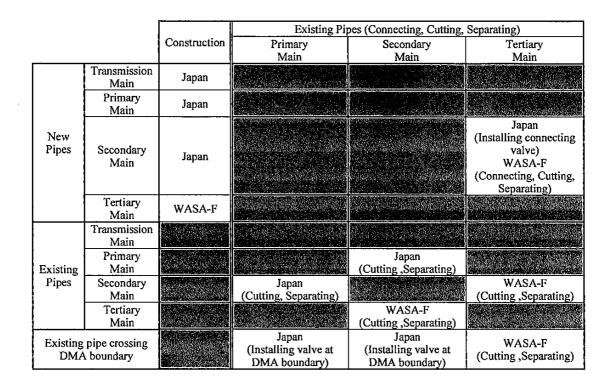
- To demolish the existing rapid sand filter, and backfill and consolidate its land

- To demolish the 2 existing overhead reservoirs located in the candidate sites of new overhead reservoirs

WASA-F explained the budget for following activities would be secured from [regular budget/PC-1 budget]

9-8. Demarcation of pipe works

 ζ ^{The} Team suggested the demarcation of the pipe replacement as follows. Pakistani side agreed on the demarcation between Japanese side and WASA-F.



9-9. Tax exemption

U.

Both sides confirmed that the exemption of tax including Value Added Tax (VAT), customs duty, and any other taxes and fiscal levies, which is to be imposed in relation to the Project, will be ensured by the Pakistani side. Both sides agreed that WASA-F would take any necessary procedures for tax exemption, and in case that tax exemption should not be secured, the cost of tax would be borne by Government of Punjab.

9-10. Project Implementation Unit

The Team explained an importance of the collaboration between WASA-F and Japanese contractor during the construction period especially for installing pipes by Japanese side and cutting pipes by WASA-F. In order to implement smoothly and efficiently, the Team requested WASA-F to form the project implementation unit (PIU) with qualitative and quantitative WASA-F staff, preferably, one Director (or Deputy Director) as additional assignment, one Assistant Director & one Sub Engineer as fulltime assignment and one Sub Engineer as additional assignment. WASA-F agreed on it.

5.08.2.20

In M

9-11. Target year and outcomes of the Project

Both sides agreed that the target year of the Project is 2038 in accordance with the Water Supply Master Plan made by JICA, and that outline design of the Project shall be conducted based on the expected demand and situation at the target year.

JICA will conduct ex-post evaluation, in principal, after the target year based on the evaluation indicators (target of outcomes) set by the Preparatory Survey.

Both sides also agreed to examine and set adequate and realistic target outcomes through further survey, regarding the improvement of water supply services at the Project site as of 2026, which is considered to be around three years after the completion of the Project.

9-12. Importance of WASA-F commitment

Both sides understood that the pilot activity of JICA M/P achieved the improvement of water supply services by establishing the virtuous cycle in WASA-F as follows.

(Virtuous cycle)

- (1) Improvement of the water supply services(extension of water supply time, increase of water pressure at faucet) by constructing DMA
- Ť
- (2) Enhancement of the customer satisfaction
- t
- (3) Increase of water tariff collection rate and revenue of WASA-F
- Ť
- (4) Further improvement of water supply services by further investment

The Team explained that WASA-F took necessary actions such as establishing taskforce team for decreasing the leakage ratio, increasing the number of customer and improving the skill of meter reading during the pilot activity to improve water supply services. To achieve the target of the Project, WASA-F geeds to continue taking these actions during the implementation of the Project as well. The Team requested WASA-F to keep on making a commitment for sustaining the virtuous cycle by preparing necessary human resource, goods and budget in order to achieve target of the Project. WASA-F agreed to it.

App 4(1)-8

25-08-200 App 4(1)-9

ç

.

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 Japanese Grant

Annex 4 Project Monitoring Report (template)

Annex 5 Major Undertakings to be taken by Pakistan

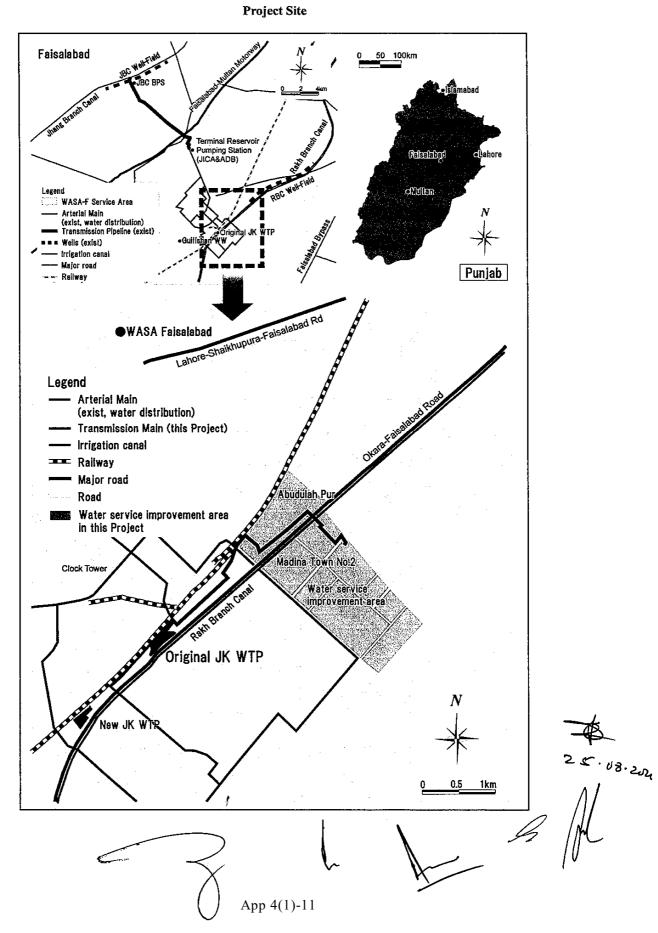
Annex 6 Consent to Use 20 Cusec Canal Water

25.03 2000

l la



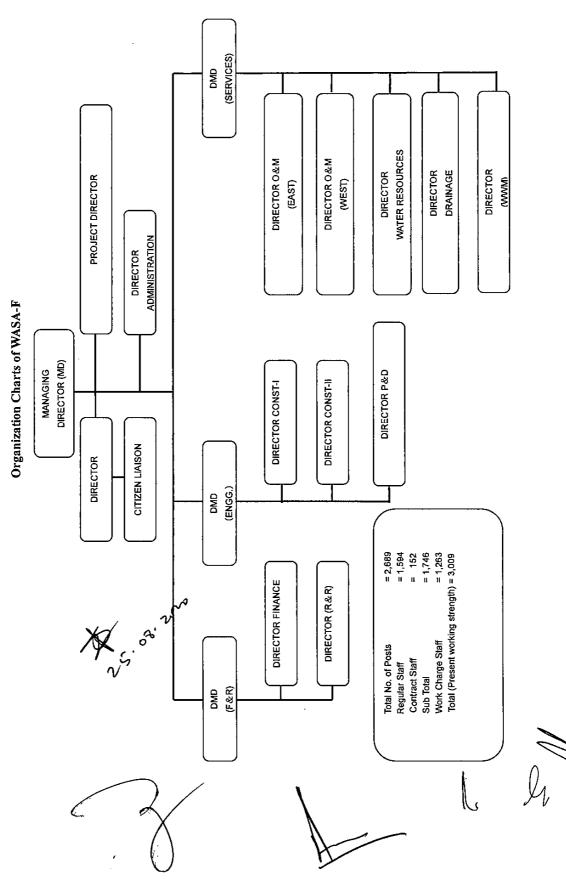




¢

6.

Annex 2



~*

.

*• .

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of

App 4(1)-13

L

relevant agencies of the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

- (1) Implementation Stage
- 1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms" and Conditions for Japanese Grant (January 2016)."

App 4(1)-14

- 2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)
 - a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.
 - b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the

App 4(1)-15

Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

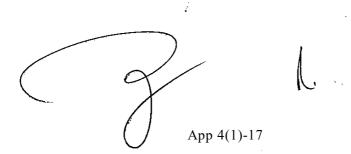
The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

5 4

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

25.03.200



,

Attachment 1

PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japancse Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
2. Appraisal	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		×			x		
3. Implementation	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring &	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to . change	x		x			
evaluation	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

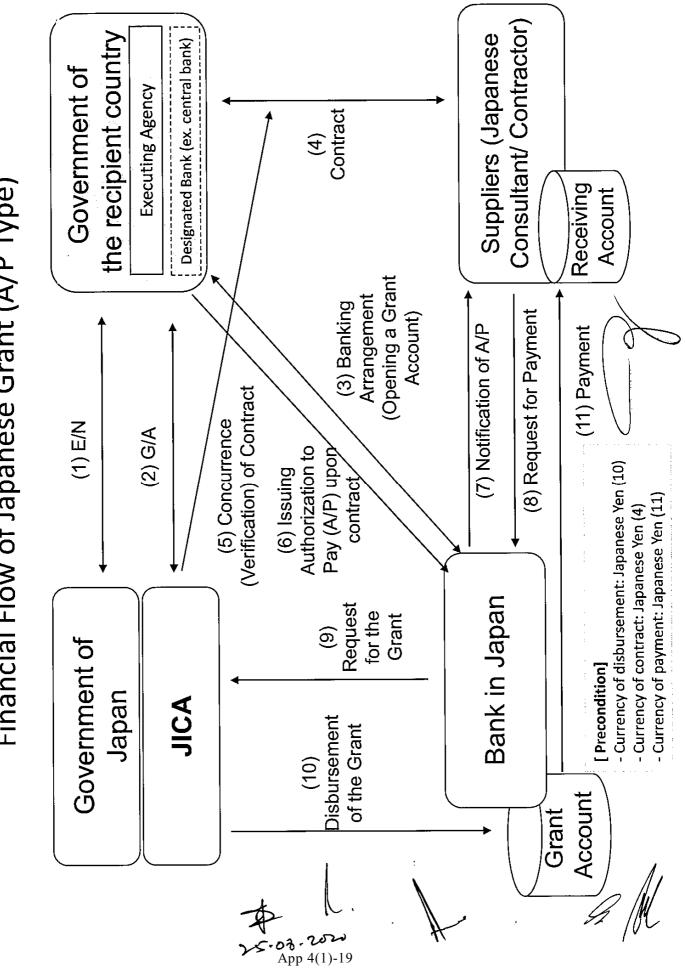
notes;

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

°2

M



Attachment 2

Financial Flow of Japanese Grant (A/P Type)

Date: Ref. No.

JAPAN INTERNATIONAL COOPERATION AGENCY JICA XXX OFFICE

[Address specified in the Article 5 of the Grant Agreement]

Attention: Chief Representative

Ladies and Gentlemen:

NOTICE CONCERNING PROGRESS OF PROJECT

Reference: Grant Agreement, dated <u>署名日(signed date of the G/A)</u>, for <u>プロジェクト名(name</u> of the Project)

In accordance to the Article 6 (3) of the Grant Agreement, we would like to report on the progress of the Project up to the following stages:-

[Common]

Preparation of bidding documents - result of detailed design

Completion of final works under construction/procurement contract

[Construction]

Monthly progress Month/Year]

[Procurement of Equipment]

Shipping/delivery, hand-over (take over) of equipment

- Installation works
- Operational training

Other

Please see the details as per attached Project Monitoring Report (PMR).

Very truly yours,

[Signature] [Name of the signer] [Title of the signer] [Name of the executing agency]

App 4(1)-20

cc: Director General

.

Financial Cooperation Implementation Department Japan International Cooperation Agency

[Address specified in the Article 5 of the Grant Agreement]

25.07-200



App 4(1)-21

. .

<u>Project Monitoring Report</u> on <u>Project Name</u> Grant Agreement No. <u>XXXXXXX</u> ^{20XX, Month}

Organizational Information

Signer of the G/A	Person in Charge	(Designation)
(Recipient)	Contacts	Address:
		Phone/FAX:
		Email:
Executing	Person in Charge	(Designation)
Agency	Contacts	Address:
		Phone/FAX:
		Email:
	Person in Charge	(Designation)
Line Ministry		
	Contacts	Address:
		Phone/FAX:
		Email:

General Information:

Project Title		
E/N	Signed date: Duration:	
G/A	Signed date: Duration:	
Source of Finance	Government of Japan: Not exceeding JPYmil. Government of ():	
XX 6	\mathcal{T}	

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

alitative indicators to measure the attainment	of project	t objective	 , et
ilitative indicators to measure the attainment	or project	tobjective	 the second s

2: Details of the Project

2-1 Location

2-1	LUCATION		
	Components	Original	Actual
		(proposed in the outline design)	
1.			
			•

2-2 Scope of the work

Components	Original* (proposed in the outline design)	Actual*
1		

Reasons for modification of scope (if any).

(PMR)

2 58.200 App 4(1)-23

S/M

2-3 Implementation Schedule

<u> </u>	Original	
Items	(proposed in the (at the time of signing outline design) the Grant Agreement)	Actual

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

- 2-4-1 Progress of Specific Obligations See Attachment 2.
- 2-4-2 Activities See Attachment 3.
- 2-4-3 Report on RD See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components		Cos (Millior	it Yen)
Original (proposed in the outline design)	Actual (in case of any, modification)	Original ^{1),2)} (proposed in the outline design)	Actual
1.			
Total			

Yen

Note: 1) Date of estimation: 2) Exchange rate: 1 US Dollar =

2-5-2 Cost borne by the Recipient

	Components		Cost (1,000 Ta		
	Original (proposed in the outline design)	Actual (in case of any modification)	Original ^{1),2)} (proposed in the outline design)	Actual	
	1.				Ŵ
X.	App 4(1)-24	A		L.	h

1) Date of estimation: Note:

2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

	K)		
2-6	Executing Agency		

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original (at the time of outline design)

name:

role:

financial situation:

institutional and organizational arrangement (organogram): human resources (number and ability of staff):

Actual (PMR)

2-7 **Environmental and Social Impacts**

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).

- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).

- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original (at the time of outline design)

Actual (PMR)

Budgetary Arrangement 3-2

- Required O&M cost and actual budget allocation for O&M

Original (at the time of outline design)

₹ 2 M 25-08-2024 4 App 4(1)-25

Actual (PMR)

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (at the time of outline design)

Potential Risks	Assessment
. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
(Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
æ	Analysis of Probability and Impact:
X & ob	Mitigation Measures:
	Action required during the implementation stage:
- d	· · · · · · · · · · · · · · · · · · ·
	5

	Contingency Plan (if applicable):	
Actual Situation and Cour	Itermeasures	
(PMR)		

5: Evaluation and Monitoring Plan (after the work completion)

5-1 **Overall evaluation**

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

3-

6

Attachment

- 1. Project Location Map
- 2. Specific obligations of the Recipient which will not be funded with the Grant
- 3. Monthly Report submitted by the Consultant
- Appendix Photocopy of Contractor's Progress Report (if any)
 - Consultant Member List
 - Contractor's Main Staff List
- 4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
- 5. Environmental Monitoring Form / Social Monitoring Form
- 6. Monitoring sheet on price of specified inaterials (Quarterly)
- 7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)

F. On Vo

- 8. Pictures (by JPEG style by CD-R) (PMR (final)only)
- 9. Equipment List (PMR (final)only)
- 10. Drawing (PMR (final)only)
- 11. Report on RD (After project)

7

App 4(1)-28

Attachment 6

¢ `

Monitoring sheet on price of specified materials

		•					
	a of payment i) Price (Inneased) P≡C + D						
	<u>a of jærya</u> () <u>Prifæ</u>						
	<u>Clonditution</u> Price (Decreased)) <u>D=C</u> – D						
	<u>ା</u> ମିରେ (<u>10</u> ଆି≓						
i	<u>dorect</u> e	•	•				
	al 1% of Convert Prite D	i					
		•	•		-		_
	ର୍ଣ୍ଣାଳୀ (ଭର୍ଯ ଜୁଲ୍ଲ (େ≦∆ × B						
	Undit (YY)	•	•				
	<u>Initial Unit</u> Price (??) B						
	8	Ĕ	et				
	il Volun ≜	•	•				
	<u>Jandie</u>						
irmed)	ভেমিহ্রাচ						
ns (Conf	টাল্লী আঁছা						
onditior	ú Bjeeð						
. Initial Conditions (Confirmed)	<u>I</u> ttems (tem 1	[tem 2	tem 3	tem 4	ftem 5	
1. I		1 I	2	3 3 1	4 I	5 I	
	/						
	<i>ب</i>						1

Monitoring of the Unit Price of Specified Materials
 Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

						_	•
ស្រុក							
<u>છેલેછ</u>							
400 C							
Srei Ornomik, 20115				ç.			
<u> 2006</u> Omeerkh, 2015							
list Omonth, 2015		r.					
Kems of Specified Metersels	Item 1	Item 2	Item 3	Item 4	Item 5		
	H H	2	က	4	പ]
		سر سر	$\overline{\uparrow}$		c		
A	Ъb	-1(1)	-25	1		

(3) Summary of Discussion with Contractor (if necessary)

A G

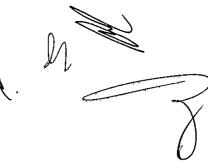
25.03.200

Attachment 7

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement	Foreign Procurement	Foreign Procurement	Total
	(Recipient Country)	(Japan)	(Third Countries)	Q
	A	B	C	
Construction Cost	(%D/V)	(B/D%)	(C/D%)	
Direct Construction Cost	(%D%)	(B/D%)	(C/D%)	
others	(%U/V)	(B/D%)	(C/D%)	
Equipment Cost	(WD%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(%D%)	. (B/D%)	(C/D%)	
Total	(%D/V)	(B/D%)	(C/D%)	





, ,

•

Major Undertakings to be taken by the Government of Pakistan

1. Specific obligations of the Government of Pakistan("the Recipient" of the Grant) which will not be funded with the Grant

(1) Before the Bidding

1.6			T 1	The second	D.C
No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To obtain re-construction permit of new-intake facility from the relevant agencies/authorities, if necessary * *The details will be confirmed by the Preparatory Survey	by the end of June 2019	WASA-F		
2	To open bank account (B/A)	within 1 month after the signing of the G/A	WASA-F		
	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract	WASA-F		
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation.	before the final approval of PC-1	WASA-F		
5	To complete the resettlement of WASA-F officers living around the 2 existing overhead reservoirs which will be demolished for the Project	before the signing of the G/A	WASA-F		
6	 To clear, reclaim, consolidate and level the following lands/sites * 1) Site for renewed Jhal Khanuana WTP (existing raw water storage tank B and rapid sand filter) 2) Site for 2 new water distribution centers 3) Other sites (if necessary) *The details will be confirmed by the Preparatory Survey 	before notice of the bidding document(s)	WASA-F		
7	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of bidding document(s)	WASA-F		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

. .

.66.

4

App 4(1)-31

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Suppliers (s)(including suppliers, contractors and/or consultants)		WASA-F		
	To bear the following commissions to a bank in Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	WASA-F		
	2) Payment commission for A/P	every payment	WASA-F		
	To handle duty (tax) exemption procedures and to take necessary measures as well as provide requisite legal and/or administrative documentations for customs clearance to the customs broker/forwarder to be employed by the Supplier(s) at the port of disembarkation for the materials and equipment imported for the Project as well as sending back of any defective equipment and/or spare parts to the manufacturer for repair at the factory or replacement and importation thereof into the country of the Recipient during the-implementation and warranty periods of the Project.	during the Project	WASA-F		
	1) Marine (air) transportation of the Products from Japan to Pakistan		Supplier(s)		
	 Internal transportation from the port of disembarkation to the Project sites 		Supplier(s)		
	To accord Japanese and other foreign nationals including their dependent/s (if any), whose services may be required in connection with the supply of products and services under the signed contracts, such facilities as may be necessary for their entry into Pakistan and stay therein for the smooth and uninterrupted performance of their work (i.e. to secure the appropriate visa including its extension/s required by the recipient country in connection thereof).	during the Project	EAD WASA-F		
	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted (with regard to the internal taxes, the total percentages of rates of the sales tax imposed on the said purchase shall be zero percent (0%) or the sales tax imposed on the said purchase shall be exempted.)		EAD WASA-F		
	To arrange the maximum countermeasures and ensure the appropriate security of the whole Project sites and of the Japanese and other foreign nationals assigned to the Project, with deployment of city police through its Administration & Security Branch in addition to the private security arrangement by the Suppliers. 1) To arrange security around the Project sites with the police. 2) To arrange security around the accommodation(s) of the Consultants & the Contractor with the police. 3) To arrange escort guard with the police during movements between the accommodation(s) of the Supplier(s) and the Project sites.	prior to the commencement of and during implementation of the Project	WASA-F through District Police		
	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s) subject to electricity/water supply/sewer charges by the supplier				
	 Electricity The distributing line to the site *To be confirmed by the Preparatory Survey 	before start of the construction	WASA-F		
	 Water Supply The city water distribution main to the site *To be confirmed by the Preparatory Survey 	before start of the construction	WASA-F		
	3) Drainage The city drainage main (for storm, sewer and others) to the site	before start of the construction	WASA-F		
	the st	\sum	$\int l$		Ŷ
	() App $4(1)-32$				

	*To be confirmed by the Preparatory Survey			
	To extend the existing arterial main pipes to the raw water reservoir of renewed Jhal Khanuana WTP or new ground reservoirs in order to meet water demand during canal close period. *To be confirmed by the Preparatory Survey		WASA-F	
9	To provide necessary working spaces with internet connection at the WASA-F Office.	during the Project	WASA-F	
10	To bear all the expenses, other than those to be borne by the Grant, necessary for the implementation of the Project.	during the Project	Govt. of Punjab & WASA-F	
11	To implement EMP and EMoP	during the construction	WASA-F	
12	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	WASA-F	
13	To take necessary measures for safe-construction - traffic control *To be confirmed by the Preparatory Survey	during the construction	WASA-F	
14	1)To submit Project Monitoring Report	every month	WASA-F	
	2)To submit Project Monitoring Report (final)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	WASA-F	
15	To submit a report concerning completion of the Project	within 6 months after completion of the Project	WASA-F	

.09. 2NW 25

.

•

e.

(3) After the Project

.

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	WASA-F		
	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between WASA-F and JICA.	for three years after the Project	WASA-F		
	 To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Allocation of additional staff for operation and maintenance 3) Routine check/Periodic inspection 	After completion of the construction	WASA-F		
			A'	, ,	H
				•	

App 4(1)-34



Subject:-

Office of the Executive Engineer Hafizabad Division LCC (W) Faisalabad **IRRIGATION DEPARTMENT** Phone. # 041-9200473 E-Mail-xenhfizabad@yahoo.com

The Managing Director Water & Sanitation Agency, Faisalabad.

Dated 31.07.18 136-1 2 308 No. CONSENT TO USE ALREADY ALLOCATED 20 CUSEC CANAL

WATER AT OLD JHAL KHANUANA CHOWK.

Reference. Superintending Engineer, Lower Chenab Canal West Circle, Faisalabad letter No. 3696/158-R dated 28.07.2018.

Please refer to Superintending Engineer, Lower Chenab Canal West Circle, Faisalabad letter under reference on the cited subject vide which minutes of meeting dated 21.07.2018 issued. Your agency demanded further 13 cusec canal water from Dijkot Disty. Following points were discussed and agreed.

- 1. Banks of Dijkot Disty from Head to RD 10+000 will have to raise to maintain free board which is agreed by Managing Director WASA. Cost estimate will be deposit at time of start of Project.
- 2. Raising of the Bridge at RD 8+000 Dijkot disty (Novelty Pull) for the smooth running of the Canal water supply in case of work not executed by the other agency.
- З. Waste water drain which are already constructed parallel to the Dijkot Disty should be extended to Downstream Novelty Bridge upto RD 10+000 from RD 8+000 Dijkot Disty.
- 4. In emergency the WASA also take Canal Water from Tulwala Disty at RD 2+000/L and raising free Board of Tulwala Disty upto RD 8+000 and raising Bridge RD 8+000 (Novelty Pull).
- 5. The disposal Station of rainy water of the M.C High School and its adjoining Area at RD 3+000/L Dijkot Disty may be shifted at RD 10+000/L Dijkot disty.

As agreed in the meeting, 13 cusec canal water supply will be provided to WASA from Dijkot Disty on the above mentioned conditions. At present working by 7.0 cusec consumption balance 13.00 cusec intend to draw from date of commencement of the Project which will be consumed 20.00 cusec.

.08.2000

Hafizabad Division Faisalabad.

CC

- 1. Chief Engineer, Faisalabad Irrigation Zone Faisalabad.
- 2. Superintending Engineer Lower Chenab Canal West Circle Faisalabad.
- 3. Sub Divisional Officer, Uqbana Sub Division Faisalabad

App 4(1)-35



App 4(1)-36

MURITES OF THE MEETING FOR CONSENT TO USE ALREADY ALLOCATED 23 GUSEC GANAL WATER AT GLD JHAL KHANUANA CHOWK.

A meaning was hald for consent to use already allocated 20 cused canal water at RD 200-450/5 Rakh Branch (New due to the construction of the Underpass Jhal Khanuana at RD 200-450/5 Rakh Branch, ouclet was shifted at RD 0+703/R Dijket Disty) was held on 21 07.2018 at 25000 4.M. In the office of the Superintending Engineer. Lower Chenab Canal West Circle Case400.40

(c: 50(1+c)

For Ala 10-

The participants of the theeting were named as under-

- Ghuliam Murtata
 Superfinianding Engineer
 Lower Chanab Canal West Dirde
 Falsalabad.
- Facir Muhammad Ch. Managing Director Metar and Sanitation Agency Pasalabao
- Muser-Lo-Chi Dewood Sister of Engineer Hafuebeo Division (LCOW Felseleded)
- L Acres Niser Unactor (140) (11484 Feisered

Hoose Unisher Deputy Director WASA Hassalaced

Junaio Akber Sub Divisional Officer. Jocene Sub Division Falsalabed.

-1 0 0 0 Obay No.-

In the meeting, the Water Sanitation Agency Faisalabad demanded for "Consent to use already allocated-20 cusec canal water at RD 277+450/R old Jhal Khanuana Chowk" Managing Director WASA pointed out that original discharge of Water Treatment Plant is 20 cusec. An Agreement between Municipal Committee Lyllpur (Now in Control of WASA) was executed since 1953 for drinking purposes at RD 277+450/R Rakh Branch Jhal Khanuana Head Works, but WASA as per letter No.331/AD(W)WASA dated 24.07.1993 not presently using canal water & will use only as standby arrangement. WASA Faisalabad requested that biffing may be made in future as per actual consumption of Canal Water. It was observed an

App 4(1)-37

Page 1 of 2 /

Scanned by CamScanner

about 1.50 Cs on average used as standby arrangement from 1902-2009. Since 2010 WASA is using about 7.00 Cs on average and billing will be made accordingly. However Water Treatment Plant remained closed during construction of underpass at RD 277+450/R Rakh Branch Jhal Khanuana for 11/2 year during 2014-15. At present working by 7.0 cusec consumption balance 13.00 Cs intend to draw from date of commencement of the Project which will consume 20.00 Cs as agreed by Water and Sanitation Agency Faisalabad

The Managing Director, WASA Faisalabad agreed to pay all the outstanding rules pending against WASA Faisalabad besides the funds required for works required to be carried out on Dijkot Disty to meet with the demand of 13 cusec further as belows:-

- 1. Banks of Dijkot Disty from Head to RD 10+000 will have to raise to maintain free board which is agreed by Managing Director WASA. Cost of estimate will be deposited at time of start of Project.
- 2. Raising of the Bridge at RD 8+000 Dijkot disty (Novelty Pull) for the smooth running of the Canal water supply.
- 3. Waste water drain which are already constructed parallel to the Dijkot disty extend
 - to Downstream Novelty Bridge upto RD 10+000 from RD 8+000 Dijkot Disty.
- 4. In emergency the WASA also take Canal Water from Tulwala Disty at RD 2+000/L and raising free Board of Tulwala Disty upto RD 8+000 and raising Bridge RD 8+000 (Novelty Pull)
- 5. The disposal Station of rainy water of the M.C High School and its adjoining Area at RD 3+000/L Dijkot Disty will be shifted at RD 10+000/L Dijkot disty.

Recommendations.

Keeping in view the position explained above, it is agreed that Consent for balance 13.00 cusec making total 20 cusec canal water supply from Dijkot Disty be intimated to WASA Authority to proceed further in the matter.

App 4(1)-3

158-R

2018/278/67 dated 12.05.2018.

Superintending, Engineer Lower Chenab Canal West Circle Faisalabad.

NO.

2018. 28-07

CC

1. The Chief Engineer Irrigation Faisalabad with reference to his letter No.2959/WI/ The Managing Director, WASA, Faisalabad. 3. The Executive Engineer, Hafizabad Division, LCCW, Faisalabad. Page 2 of 2

Scanned by CamScanner

Appendix4 Minutes of Discussions

(2) Technical Note on the First Survey in Pakistan

Technical Note on the Preparatory Survey for the Project for Improvement of Water Treatment Plant and Water Distribution System in Faisalabad

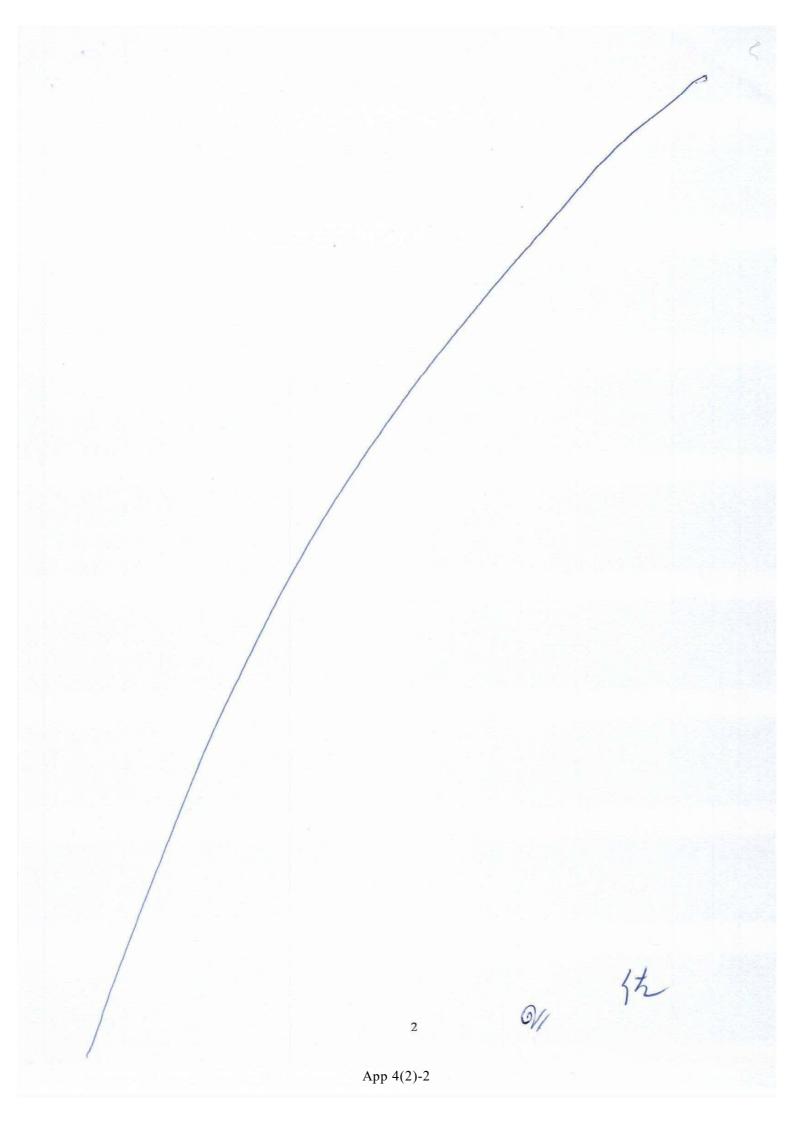
Faisalabad, 27th April, 2019

Mr. Ghulam Shabbir Director (P&D) WASA-F On behalf of Managing Director Water and Sanitation Agency, Faisalabad

结婚

Dr. Nobuyuki Sato Project Manager JICA Preparatory Survey Team

1



The technical meeting was held on Saturday, 27th April, 2019 at the conference room of Water and Sanitation Agency, Faisalabad (hereinafter referred to as "WASA-F"). Dr. Nobuyuki Sato, Project Manager of JICA Preparatory Survey Team, explained a summary of First Working Period (23rd March 2019 to 8th May 2019) in Pakistan. The following items were confirmed by WASA-F and JICA Preparatory Survey Team.

(1) Name of Jhal Khanuana Water Treatment Plant

The Master Plan (hereinafter referred to as "M/P") project calls Jhal Khanuana (hereinafter referred to as "JK") Water Treatment Plant (hereinafter referred to as "WTP") as Old/Original JK WTP and Renewed JK WTP. There is also a WTP called as New JK WTP assisted by French Government. For avoiding the confusion, the name of the WTP was discussed. As a result, the WTP to be planned by JICA Preparatory Survey is called as Old JK WTP and the WTP assisted by French Government is called as New JK WTP. These names will be effective after July 2019.

(2) Design Population

According to M/P project, and reviewed by WASA-F and JICA Preparatory Survey Team, the projected water demand and the service connections are shown in Table 1 and Table 2. WASA-F and JICA Preparatory Survey Team confirmed the values presented in Table 1 and Table 2.

-	Year 2	2023 Year 2038		2038
DMA	Connection (nos)	Demand (m ³ /d)	Connection (nos)	Demand (m ³ /d)
DMA I-1	920	2,380	2,010	4,190
DMA I-2	850	2,200	1,850	3,870
DMA II-1	1,140	2,950	2,350	4,910
DMA II-2	660	1,700	1,350	2,820
DMA II-3	710	1,840	1,460	3,050
DMA II-4	1,090	2,830	2,250	4,680
Total	5,370	13,900	11,270	23,520

Table 1: Projected Water Demand and Service Connections

Table 2: Major Index for Demand Projection

Item	Unit	Yr 2023	Yr 2038
Service ratio	%	60%	100%
Per-capita	L/day/person	133	145
Loss in Percentage Terms	%	45%	20%
Family Size	person/family	7.15	7.05

休

3