6.9 Minutes of Meeting between JICA and WAJ (December 21, 2015)

MINUTES OF THE MEETING
ON THE STUDY FOR BASIC/DETAILED DESIGN AND DRAFT BIDDING DOCUMENTS (COMPONENT B) UNDER THE PROJECT FOR THE STUDY ON WATER SECTOR FOR THE HOST COMMUNITIES OF SYRIAN REFUGEES IN NORTHERN GOVERNORATES IN THE HASHEMITE KINGDOM OF JORDAN

Following the recommendations in the Water Supply Master Plan (hereinafter referred to as "M/P") submitted in January 2015, preparation for basic/detailed design and draft bidding document was requested by Water Authority of Jordan (hereinafter referred to as "WAJ"). In response to the request, the Japan International Cooperation Agency (JICA) decided to assist the study for basic/detailed design and draft bidding document for the part of recommended Phase 1 projects (hereinafter referred to as "the BD/DD Study").

JICA sent the study team for discussing the outline of the BD/DD Study (hereinafter referred to as "the Study Team") to Jordan headed by Mr. Shigeyuki Matsumoto, JICA Senior Advisor, and is scheduled to stay in the country from December 18th to 22nd, 2015.

The Study Team held a series of discussions with WAJ and conducted a field survey in the project area. In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Study Team will proceed to further works and prepare the related documents.

Amman, December 21st, 2015

Mr. Shigeyuki Matsumoto
Leader
The Study Team
Japan International Cooperation Agency
Japan

Eng. Tawfiq Z. Habashneh
Secretary General
Water Authority of Jordan
Jordan

ATTACHMENT

1. Objective and basic concept for the BD/DD Study

   The objective of the BD/DD Study is to assist WAJ with preparing the basic/detailed design and draft bidding documents for the part of recommended Phase 1 projects described in Annex 1. WAJ has acknowledged that any drawings and documents formulated by the BD/DD Study will be utilized only for the procurement procedure of the Project.

2. Scope of the BD/DD Study

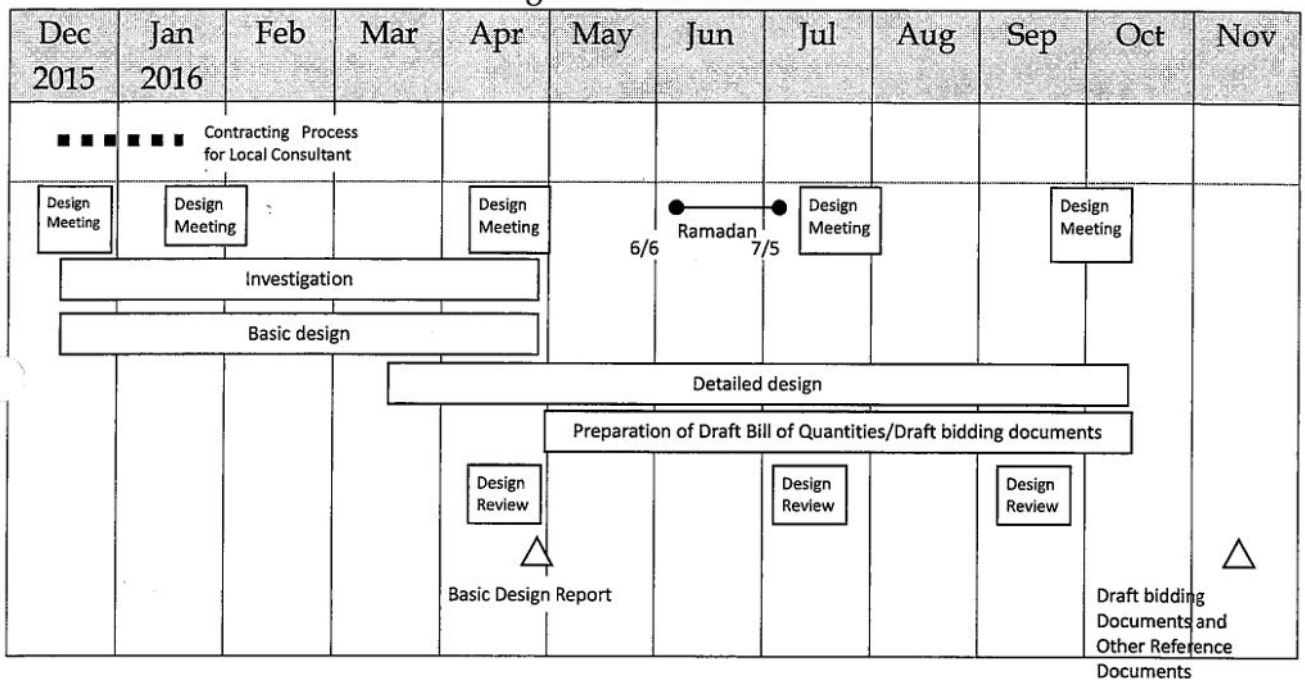
   Strengthening of distribution pipes in the 4 District Metered Areas (DMAs) was selected for the scope of BD/DD Study. The 4 DMAs is shown in Annex 1. Strengthening of pipes in these DMAs is required to distribute water more effectively and efficiently. The target DMAs have the following characteristics so that they are selected:

   - High population density
   - Many Syrian refugees
   - Developed areas
   - hence, high water demand

3. Process of the BD/DD Study

3-1. The BD/DD Study will be completed by November 2016 as shown in the figure below.

Figure: Work Schedule



3-2. The BD/DD Study will be carried out as a part of Component B of "The Project for the study on water sector for the host communities of Syrian refugees in Northern governorates in the Hashemite Kingdom of Jordan". Thus, a part of JICA Expert Team (hereinafter referred to as "the BD/DD Study Team") has the responsibility in the BD/DD Study. The BD/DD Study will be carried out with support from local consultants, who are supervised by the BD/DD Study Team.

3-3. The basic design will be carried out at the start prior to the detailed design and draft bidding document preparation. At the initial stage and final stages of the basic design, basic contents will be explained and discussed with WAJ to reach mutual agreement. The confirmed matters will be compiled in the Minutes of the Meetings (hereinafter referred to as "M/M") between WAJ and the BD/DD Study Team.

3-4. After signing the M/M, detailed design will be started. This will ensure that design changes during the implementation of detailed design will be minimized.

3-5. During the detailed design, basic contents will be explained and discussed with WAJ to reach mutual agreement at the intermediate stage. Same as the basic design, the

confirmed matters will be compiled in the M/M between WAJ and the BD/DD Study Team.

3-6. Submission of product of the BD/DD Study

The products of the BD/DD Study (hereinafter referred to as "the Draft Design Documents") will be submitted to WAJ for its approval.

The Draft Design Documents will be prepared in accordance with those employed by WAJ. It is WAJ's responsibility to finalize the Draft Design Documents prepared by BD/DD Study so that they can be utilized for the bidding process.

(1) Draft Basic Design Documents
- Submission period: Around May 2016
- No. of copies: 3 copies in English (simple book form)

(2) Draft Detailed Design Documents and Draft Bidding Documents
- The following will be summarized; (i) Instructions to bidders; (ii) Draft agreement; (iii) Special conditions; (iv) General conditions; (v) Specifications; (vi) Drawings; (vii) Process chart; (viii) Tender forms; (ix) Quantity and cost records; and (x) Other necessary information.
- Submission period: Around November 2016
- No of copies: 20 copies in English; 1 copy in CD-R

3-7. The BD/DD Study Team will internally and independently inspect the documents at every step of the meetings, initial and final stages of basic design, initial and final stages of detailed design, and before submitting documents to WAJ.

3-8. WAJ is requested to assign counterparts who are in charge of discussing, reviewing and accepting the documents prepared by the BD/DD Study. As mentioned in the below (4. and 5.), WAJ has the responsibility in finalizing the Draft Design Documents. WAJ explained that it would formulate Steering Committee and Technical Committee with members from WAJ, PMU and YWC. The assigned personnel for these committees are as follows:

< Steering Committee >

(1) Eng. Tawfiq Z. Habashneh, Secretary General of WAJ
(2) Eng. Bassam Saleh, Assistant Secretary of WAJ
(3) Eng. Mohammad Al-Rababaah, Managing Director of YWC
(4) Eng. Iyad Dahiyat, PMU Director

< Technical Committee >

(1) Eng. Khalid Abu Qamar, WAJ
(2) Eng. Reham Bani Hani, WAJ
(3) Eng. Salameh Mahasneh, PMU
(4) Eng. Bashar Bataineh, PMU
(5) Eng. Ashraf Bataineh, YWC
(6) Eng. Dalal Eliwah, YWC
(7) Eng. Bilal Rabie, YWC

4. Technical Inspection by WAJ

WAJ shall conduct technical inspection to confirm technical aspects of the Draft Design Documents prepared by the BD/DD Study, from the perspectives of safety, durability, usability and other factors at its own expense, before JICA's final review.

On the completion of the BD/DD Study, JICA may review the Draft Design Documents inspected by WAJ. WAJ shall submit a letter certifying that its technical inspection has been conducted properly, in a pre-agreed format attached as per Annex 2 within 1 month after the submission of Draft Design Documents by the BD/DD Study Team. Further, WAJ shall any time submit to JICA, for JICA's reference, any related documents and information as JICA may reasonably request. JICA's right to perform such review shall not be deemed to be an obligation of JICA. WAJ shall not be exempted from any of its obligations to confirm technical aspects of the Draft Design Documents.

When duly made and signed Annex 2 is submitted from WAJ to JICA, JICA can deem that WAJ's technical inspection has been carried out properly, and may transfer to WAJ the right to use the Draft Design Documents without any compensation.

5. WAJ's Liability

Since WAJ will confirm the progress of the BD/DD Study and the contents of the Draft Design Documents as mentioned in the above (3. and 4.), WAJ shall be liable for any loss or damage that may arise from or in connection with the BD/DD Study and/or the Draft Design Documents, including product liabilities related thereto. WAJ shall indemnify JICA and the BD/DD Study Team against any claim that may arise from or in connection with the BD/DD Study and/or the Draft

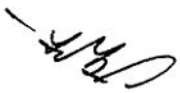
Design Documents, including product liabilities related thereto.

6. Assistance for secure funds by WAJ

In order that the Draft Design Documents are utilized by WAJ, the BD/DD Study Team will assist WAJ to prepare explanatory materials and explain them to other donors, if necessary.

7. Consultation

JICA, the BD/DD Study Team and WAJ shall consult with each other in good faith in respect of any matter that may arise from or in connection with the BD/DD Study, including any disputes arising from this Minutes of the Meetings.



Annex 1 Scope for the BD/DD Study

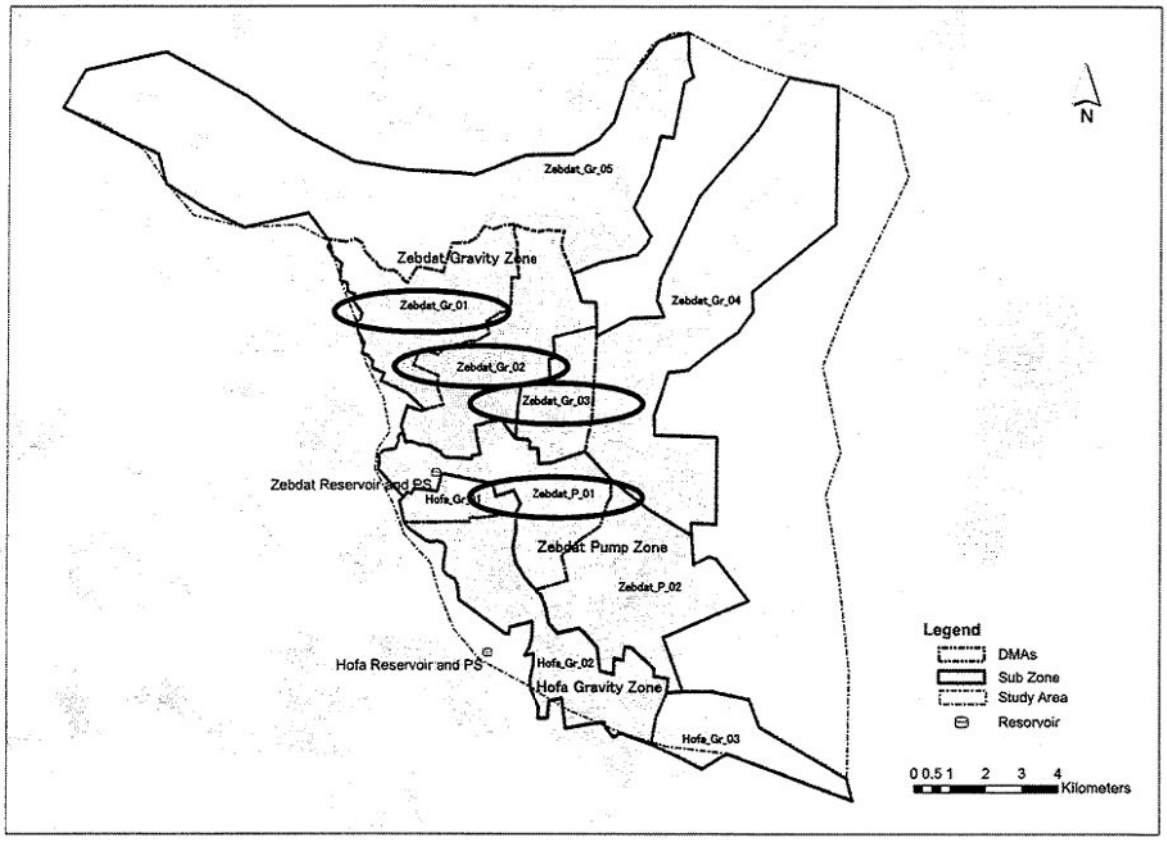


Figure-1 Proposed DMAs in Irbid and its Suburbs
(Circled DMAs are the scope of the BD/DD Study)

Table-1 Selected DMAs and components

Package (*1)	Description			Quantity
1	Distribution pipes (Strengthening)	Zebdat Gravity 02	HDPE 150,DI 200-1000 mm	26,390 m
2		Zebdat Gravity 03	DI 200 -800 mm	13,245 m
3		Zebdat Gravity 01	DI 200 -800mm	10,139 m
4		Zebdat Pump 01	HDPE 150,DI 200-600 mm	11,375 m
Total Length of Pipe				61,149 m

*1 The DMAs are listed based on the priority.

Annex 2 Draft letter for certifying technical inspection by WAJ

Date :
Ref.No. :

Mr. Kazufumi Momose
Leader (Chief Consultant)
JICA Study Team

Subject : Certification of the Draft Design Documents for the part of recommended Phase 1 projects in the Water Supply Master Plan

With respect to the BD/DD Study for the part of recommended Phase 1 projects in the Water Supply Master Plan, I, on behalf of Water Authority of Jordan (hereinafter referred to as "WAJ"), have considered and examined, among other things, the following documents (hereinafter referred to as "the Draft Design Documents") prepared by the BD/DD Study Team:

(a) Draft Basic Design Documents;
(b) Draft Detailed Design Documents; and
(c) Draft Bidding Documents.

The capitalized terms not defined herein have the same meanings as those ascribed in the Minutes of the Meetings executed between JICA and WAJ on 21st December, 2015.

Based upon the foregoing, I, on behalf of WAJ, hereby certify as follows:

1. That the specifications shown in the Draft Design Documents which WAJ has properly examined and inspected conform with:
   a) laws, standards and regulations duly established and applicable in Jordan;
   b) laws, standards and regulations generally recognized and accepted in the international community such as ISO; and
   c) structural, quantitative, geological and other demands peculiar to the prospected implementation of the part of recommended Phase 1 projects in the Water Supply Master Plan.

2. That, therefore, the specifications shown in the Draft Design Documents have safety, durability, usability and other factors critical for the implementation of the prospected implementation of the part of recommended Phase 1 projects in the Water Supply

Master Plan.

IN WITNESS WHEREOF, I, the undersigned, have hereunto set my hand and affixed my official seal, this day of XX,XX, 2016.

Very truly yours,

_____

[Name]
[Title]
Water Authority of Jordan
(Signature)

6.10 Minutes of Meeting between the Study Team and Technical Committee of WAJ

- First meeting --------- February 25, 2016
- Second meeting ------ May 17, 2016
- Third meeting -------- June 22 & 26, 2016
- Fourth meeting ------- August 16, 2016
- Fifth meeting ------- October 12, 2016
- Sixth meeting ------- January 17, 2017

Minutes of Meeting held between the Study Team for BD/DD (Component B) and Technical Committee of WAJ on 25th February 2016 from 10:00-12:00 hrs at PMU, WAJ Office

This meeting was convened as per the understanding reached between the JICA Study Team and the Water Authority of Jordan (WAJ) vide Minutes of Meeting dated 21st December 2015 (refer item No. 3.3) for carrying out the Study for Basic/ Detailed Design and draft Bidding Document (Component B) under the project for the study on water sector for the host communities of Syrian refugees in the Northern Governorates in the Hashemite Kingdom of Jordan (hereinafter referred to as "the BD/DD Study/ the Study"). The list of the participants of the meeting is given in Annex 1.

At the outset, the Director of PMU welcomed all the participants and requested the Team Leader (TL) of the JICA Study team (TEC International Co., Ltd.) to proceed with the presentation and discussion matters. The TL, first of all, introduced the members of the JICA study team and its local associate consultants M/s Arabtech Jardaneh Engineers and Architects (hereinafter referred to as "the Study team"). The presentation was given by three members of the Study Team namely Eng. Momose, Eng. Mizufune and Eng. Fatimah on different aspects of the Project and the Study. The full content of the presentation is attached as Annex 2.

The presentation went along with the discussion on the queries raised by the Technical Committee members (hereinafter referred to as "TC") and other participants of the meeting. The major points of discussion and agreement reached are presented as follows.

1. The Study team gave an introduction of the project, which included the project background, approved the water Supply Master Plan (hereinafter referred to as "MP") components and considerations/ assumptions therein.

2. TC commented on some of the assumptions of the MP such as the leakage percentage of 15% being considered as low as compared to the common practice in Jordan. The Study team clarified that the ratio is considered to be achieved at the end of the overall 4 stages of the project only and not immediately after the Phase 1 works alone. Secondly, since the supply quantity is constant and will be the base for the detailed design (demand), the ratio of leakage is not relevant at this stage.

3. TC commented on the service population considered in the MP. The Study team agreed that they will check on the up-to-date number of the served population within the project area based on the latest census data and modify accordingly, if required.

4. The Study team presented a brief description of the scope of work for the BD/DD study, which includes the following:

   (i) Strengthening of the existing water network only is considered at this phase (phase 1) which includes about 61 km of the proposed water distribution pipelines with

diameters between 150mm and 1000mm. TC commented to consider 100 mm pipeline. However, the study team explained that 100 mm pipeline is recommended to be rehabilitated during phases 2 to 4 proposed in the MP.

(ii) This study will cover only four District Metered Areas (DMAs) as specified in the MP (i.e. Zebdat Gravity 01, 02, 03 and Zebdat Pump 01)(refer to Annex2-1 also)

(iii) No rehabilitation[1] works are proposed at this phase.

(iv) Tertiary and downstream pipelines including house connection works are not considered at this phase.

5. TC mentioned about the transmission main that's being constructed between Hofa reservoir and the northern areas of Irbid up to Beit Ras. TC also queried on how this pipeline will affect the MP and the possibility of incorporating the new pipeline with the MP.

The Study team clarified that this new transmission water pipeline has been already considered in the approved MP as a part of the existing water network and will be considered during this phase of study and can be used in the distribution networks.

6. TC commented that Hofa - Bait Rass gravity pipe line is being invested successfully under JICA grant aid project by considering Zatary Aqeb and Disi as the feeding water source and not considering Zabda through Wadi Arab(II) , so it is just a matter of relocation of our sources.

The study team further explained that in MP, two or more options were compared from a view point of required energy and construction costs to reach the optimal proposed facilities and distribution zones between Zebdat and Hofa.

7. The Study team inquired about the format of the condition of contract and the special requirements of funding agencies.

The Parties present agreed to use the standard Conditions of Contract issued by the Jordanian tender Document (JTD) and to incorporate the prospective funding agency's special requirements, if any available, at the time of preparation of draft bidding documents.

8. The Study team discussed and agreed with TC on the following:

(i) The Study team will identify the new proposed pipelines that would pass through the private lands along with the requirement for right of way or land acquisition.

(ii) Later on the Contractor shall be responsible for developing the detailed construction plan, traffic and road's study as part of their responsibility under the contract.

(iii) The Study team will produce documents for 4 tender packages (one package for each zone/DMA).

[1] Replacement of GI and aged pipe more than 40 years to reduce the leakage

9. The Study team clarified that the Study team had earlier reviewed the main design conditions/criteria which was incorporated in the MP and the same will be adopted in this BD/DD Study. Few main design criteria being as follows.

   (i) Hazen-Williams roughness coefficient to be used is 110 which considered for old pipelines
   (ii) Water supply pressure range to be in between 2.5 and 7.5 bars (with some exception)

10. TL nominated Eng. Salameh Mahasneh and Eng Bashar Batayneh as the Project Managers and Coordinator from the TL side.

11. All parties agreed to consider a continuous communication approach to ensure the smoothness of this project. For this purpose it was agreed to make a close email network of Technical Committee and the Study team member, wherein any major issues to be decided or the draft reports shall be circulated by the Study team(TEC/AJ) for feedback and consent.

The meeting came to a close by extending thanks to all the participants by the chair.

Both sides confirmed on the above along with Annex 1 and 2 (enclosed).
Amman, 7th March 2016

Eng. Iyad Dahiyat
PMU Director
Water Authority of Jordan
Jordan

Eng. Kazufumi Momose
Team Leader/ JICA Study Team
TEC International Co., Ltd
Japan

Eng. Salameh Mahasneh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Eng. Bashar Batayneh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Annex 1

Technical Committee Meeting
for
The Study for Basic/Detailed Design and Draft Bidding Documents (Component B)
Under
The Project for the Study on Water Sector
for the Host Communities of Syrian Refugees
in Northern Governorates
in the Hashemite Kingdom of Jordan

Date/Time： February 25, 2016/10:00-12:00
Venue ：PMU Meeting Room, Water Authority Of Jordan (WAJ)

Name List of Attendance

Name	Organization/Affiliation
JICA/KfW	
Mr. Masaki Itagaki	JICA
Mr. Hani Kurdi	JICA
Mr.Jonas Rathfelder	KfW
Technical Committee	
Eng. Iyad Dhaiyat	PMU Director, WAJ, Steering Committee member
Eng. Khaled Abu Qamar	WAJ, Technical Committee member
Eng Reham Bani Hani	WAJ, Technical Committee member
Eng. Salameh Mahasneh	PMU,WAJ, Technical Committee member
Eng. Bashar Bataineh	PMU,WAJ, Technical Committee member
Eng. Udo Kachel	PMU,WAJ
Study Team	
Eng. Kazufumi Momose	TEC International Co., Ltd.(TEC), JICA Study Team Team Leader
Eng. Kiyoshi Mizufune	TEC, JICA Study Team
Eng. Sunil Kumar	TEC, JICA Study Team
Mr. Zuhair Saadat	TEC
Eng. Fatima Al Maharmah	Arabtech Jardaneh Engineers and Architects (AJ)
Eng. Jomanah Al Btouch	AJ
Eng. Montaser Al Jazzazi	AJ
Eng. Osamah Alsheikh Ali	AJ

Name List of Absence

Name	Organization/Affiliation
Eng. Ashraf Bataineh	YWC ,Technical Committee member
Eng. Dalal Eliwah	YWC ,Technical Committee member
Eng. Bilal Rabie	YWC ,Technical Committee member

Annex 2-1

Technical Committee Meeting
for
The Study for Basic/Detailed Design and Draft Bidding Documents
(Component B)
Under
The Project for the Study on Water Sector
for the Host Communities of Syrian Refugees
in Northern Governorates
in the Hashemite Kingdom of Jordan

Date/Time: February 25, 2016/10:00-12:00
Venue :PMU Meeting Room, Water Authority Of Jordan (WAJ)

JICA Study Team(TEC International Co., Ltd.)
In association with
Arabtech Jardaneh Engineers and Architects

TEC INTERNATIONAL

ARABTECH JARDANEH
proud past . focused future

1

Subject of Discussion

I. Introduction of Attendees
II. Brief Summary of Water Supply Master Plan
III. Outline of the Study for Basic/Detailed Design and Draft Bidding Documents (Component B) Approach, Methodology and Work Plan
IV. Design conditions and design criteria and other key matters
V. Discussions

2

I. Introduction of Attendees

Technical Committee	
Eng. Khalid Abu Qamar	WAJ
Eng. Reham Bani Hani	WAJ
Eng. Salameh Mahasneh	PMU(WAJ)
Eng. Bashar Bataineh	PMU(WAJ)
Eng. Ashraf Bataineh	YWC
Eng. Dalal Eliwah	YWC
Eng. Bilal Rabie	YWC
JICA Study Team/ TEC International Co. Ltd.(TECI)	
Kazufumi Momose	Team Leader/TECI
Kiyoshi Mizufune	TECI
Sunil Kumar Karn	TECI
Arabtech Jardaneh Engineers and Architects (AJ)	
Jihad_Abujamous	AJ
Fatimah Almaharmah	AJ
Jomanah Albtoush	AJ
Osama Alsheikhali	AJ

3

II. Brief Summary of Water Supply Master Plan

4

Background of MP

1. Since the armed conflict in Syria in 2011 the influx of Syrian refugees has further deteriorated the condition of water supply services in Jordan and particularly in the northern governorates which already suffers from limited water resources, small amount of per capita water supply, high NRW, etc.
2. The MP was undertaken to identify the required improvements and priority to mitigate the poor water supply services in the Study area (Irbid and Ramtha and its suburbs) where the Syrian refugees have been largely settled in the largest urban area in the northern governorates. The MP presents a water supply development plan meeting the 2035 demand of Jordanian population, which is equivalent to the 2028 demand combining Jordanian population and the current level of Syrian refugees.

5

3. Even before the influx of Syrian refugees, Water Authority of Jordan (WAJ) has implemented the construction of transmission facilities to convey the Disi fossil groundwater nationwide. WAJ has accelerated construction of the transmission facilities terminating at Hofa reservoir in Irbid suburbs (so-called the eastern transmission mains) to narrow the gap between the increasing demand and supply. These facilities are expected to be completed by 2017 and consequently the total amount of water available for the northern governorates is expected to increase to 91 Million Cubic Meters (MCM)/year from current level of 72 MCM/year.

6

4. However, supplying 91 MCM of water/year in the northern governorates will not satisfy the demand in 2017. Therefore, WAJ has already started development of the additional 30 MCM/year water source by the "Red-Dead project", totaling to 121 MCM/year water. This amount will be conveyed through so-called the western transmission mains and terminating at Zebdat reservoir in Irbid city. This amount would be able to meet the 2028 demand of Jordanian and Syrian refugees combined provided that the latter's population remains at the same level as in 2013.

7

Outline of MP

1. The MP intends to identify required facilities to distribute the available water to the Study Area and the following measures are proposed:

- Strengthening and restructuring of distribution system
- Rezoning of reservoir zones
- Strengthening of network including increase in pipe size and addition of mains
- Rehabilitation of inferior pipes (galvanized iron and old pipes)
- Distribution management for equitable supply
- Establishment of District Metered Area (DMA)
- Supervisory Control and Data Acquisition (SCADA)

8

2. The proposed facilities are to be implemented in 4 phases and target values for the Irbid and its suburbs are set as shown below.

9

Target Values for Improvement of Service in Irbid and Its Suburbs

Indicators for improvement		Current (2013)	Target values in 2035	Required main measures
Number of "No water" complaints (equitable supply)		20,801	1,000	· Distribution management for equitable supply · All measures below
Water supply pressure		0 –more than 7.5 bar	2.5 – 7.5 bar	· Strengthening and restructuring of distribution main system · Distribution management
Per capita supply (liter)		82	123	· Strengthening of distribution main system
Per capita consumption (liter)		65	104	· Strengthening of distribution main system · Leakage reduction measures
Leakage ratio	Assumption	20 %	15 %	· Replacement of inferior pipes
Leakage	Complaints	4,439	1,000	
Service population		498,800	790,200	· Distribution management for equitable supply

10

3. The proposed facilities are to be implemented in Phase 1 between 2016 and 2020 in Irbid city and its suburbs and part of the Phase 1 works are selected for scope of the basic/detailed design and draft bidding documents preparation.

11

III. Outline of the Study for Basic/Detailed Design and Draft Bidding Documents (Component B)

1. The objective of the BD/DD Study
2. Scope of the BD/DD Study
3. Others

12

Objective and basic concept for the BD/DD Study

* The objective of the BD/DD Study is to assist WAJ with preparing the basic/detailed design and draft bidding documents for the scope of BD/DD Study (the part of recommended Phase 1 projects in MP) described in Annex 1. WAJ has acknowledged that any drawings and documents formulated by the BD/DD Study will be utilized only for the procurement procedure of the Project.

13

Scope of the BD/DD Study

* Strengthening of distribution pipes in the 4 District Metered Areas (DMAs) was selected for the scope of BD/DD Study. The 4 DMAs is shown in Annex 1. Strengthening of pipes in these DMAs is required to distribute water more effectively and efficiently. The target DMAs have the following characteristics so that they are selected:
* High population density
* Many Syrian refugees
* Developed areas
* hence, high water demand

14

Annex 1 Scope for the BD/DD Study

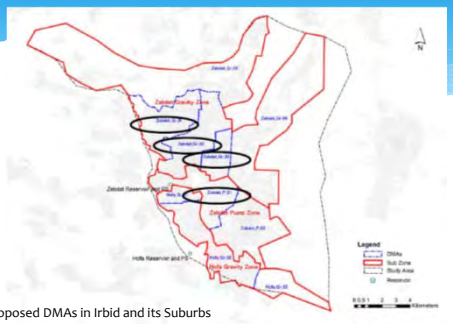


Figure: Proposed DMAs in Irbid and its Suburbs
(Circled DMAs are the scope of the BD/DD Study)

15

Selected DMAs and components

Package (*1)	Description			Quantity
1	Distribution pipes (Strengthening)	Zebdat Gravity 02	HDPE 150,DI 200-1000 mm	26,390 m
2		Zebdat Gravity 03	DI 200 -800 mm	13,245 m
3		Zebdat Gravity 01	DI 200 -800mm	10,139 m
4		Zebdat Pump 01	HDPE 150,DI 200-600 mm	11,375 m
Total Length of Pipe				61,149 m

16

Proposed Distribution pipes(Strengthening)

17

Others

* The BD/DD Study will be carried out as a part of Component B of "The Project for the study on water sector for the host communities of Syrian refugees in Northern governorates in the Hashemite Kingdom of Jordan". Thus, a part of JICA Study(or Expert) Team (the BD/DD Study Team) has the responsibility in the BD/DD Study. The BD/DD Study will be carried out with support from local consultants, who are supervised by the BD/DD Study Team.

18

- The basic design will be carried out at the start prior to the detailed design and draft bidding document preparation. At the initial stage and final stages of the basic design, basic contents will be explained and discussed with WAJ to reach mutual agreement. The confirmed matters will be compiled in the Minutes of the Meetings(M/M) between WAJ and the BD/DD Study Team.
- After signing the M/M, detailed design will be started. This will ensure that design changes during the implementation of detailed design will be minimized.

19

- During the detailed design, basic contents will be explained and discussed with WAJ to reach mutual agreement at the intermediate stage. Same as the basic design, the confirmed matters will be compiled in the M/M between WAJ and the BD/DD Study Team.

20

IV. Approach, Methodology and Work Plan

- Project Objectives
- Project Team
- Work Schedule
- Deliverables
- Project Area
- Proposed DMAs
- Estimated Pipelines Quantities
- Project Stages
- Required Information
- Open Discussion

21

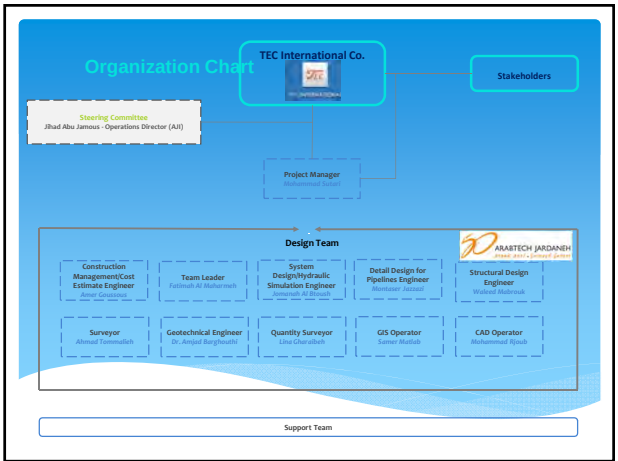
Project Objectives

- Reduction in the number of "No water" complaints (equitable supply)
- Equalization of water supply pressure
- Increase in the per capita supply and consumption
- The beneficiary population is projected about 302 thousand in 2020.

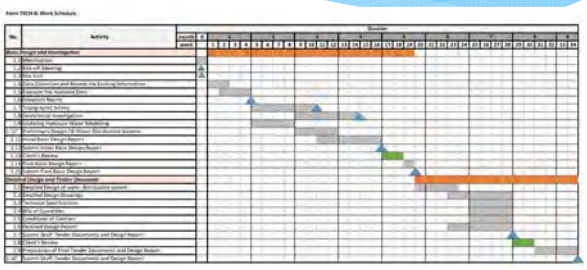
22

Project Team

23



Work Schedule



25

Deliverables

Deliverable	Submission Date
Inception Report	31 March 2016
Draft Basic Design Report	30 June 2016
Final Basic Design Report	21 July 2016
Draft Design Report and Draft Tender Documents	30 September 2016
Final Design Report and Final Tender Documents	15 October 2016

26

Project Area

27

Proposed DMAs

28

Estimated Pipelines Quantities

Package (*1)	Description			Quantity
1	Distribution pipes (Strengthening)	Zebdat Gravity 02	HDPE 150,DI 200-1000 mm	26,390 m
2		Zebdat Gravity 03	DI 200 -800 mm	13,245 m
3		Zebdat Gravity 01	DI 200 -800mm	10,139 m
4		Zebdat Pump 01	HDPE 150,DI 200-600 mm	11,375 m
Total Length of Pipe				61,149 m

*1 The DMAs are listed based on the priority.

29

Project Stages

1. Basic Design Stage
2. Detailed Design Stage

30

Basic Design Stage Activities

1. Collect and review all the required and available data.
2. Review the approved MP.
3. Identify the project area (DMAs) and the proposed replacement and strengthening pipelines based on the approved MP.
4. Survey work for the proposed pipelines (61 km based on the MP).
5. Soil investigation work required at both sides of road at the location of the main roads crossing (10 locations).
6. Preliminary design for the proposed pipelines.
7. Submitting of the Basic Design Report including a preliminary plans.

31

Detailed Design Stage Activities

1. Detailed design for the proposed pipelines.
2. Preparing Draft Tender Documents:
   - Drawings (Plans and Profiles)
   - COC
   - Specs (WAJ /YWC)
   - BoQs.
3. Preparing of Draft Design Report.
4. Submitting Draft Design Report and TD .
5. Submitting Final Design Report and TD .

32

Required Information

1. Available Master Plan (TECI).
2. All design data, calculations, hydraulic model and assumptions (TECI).
3. Existing Reports and Tender Documents (TECI).
4. Updated Base Map (YWC).
5. Existing networks and utilities (water, wastewater, reservoirs… etc) (YWC, Telecommunication company, Power Company…..)

33

Issues To Be Discussed

1. **Checking public and private land**
   - For private lands where the new pipeline passing or crossing through.
2. **Public relations work**
   - high level study for the owners of the private lands where the new pipeline passing or crossing through.
3. **Construction Plan**
   - High level plan as this is part of the contractor works during the construction stage
4. **Study of roads and traffic**
   - High level study and it will be included in the design report as a general statement about the road and traffic conditions

34

IV. Design conditions and design criteria and other key matters

- BB/DD to comply with the following Key items described in MP
- Water demand estimation
- Water sources and supplemented water
- Improvement Concept
  - ✓ Planning Target and Objectives
  - ✓ Target Values
  - ✓ Facility Planning Concepts
- Design and Planning Conditions
  - ✓ Design Population
  - ✓ Water Sources and Water Demand
  - ✓ Facility Design Criteria
  - ✓ Adopted water demand for facility design
  - ✓ Rehabilitation criteria
- Transmission and Distribution System in Irbid and Its Suburbs
- etc.

35

Design and Planning Conditions

- BB/DD to comply with Design Criteria for Distribution Facilities in MP

Facility	Design criteria
Target Year	2035
Target Population	To be filled
Target Per Capita Consumption	To be filled
Assumed Leakage rate	20 %

36

Design and Planning Conditions

- BB/DD to comply with Design Criteria for Distribution Facilities in MP

Facility	Design criteria
Reservoir	Required minimum capacity is 12 hours of daily maximum water demand; 24 hours capacity is preferable considering the current supply conditions where the transferred water is firstly stored in a reservoir and then distributed with rationing by controlling valves.
Distribution pump	Required capacity is peak hourly flow rate. Peak factor: 1.8
Distribution pipe	Required diameter is calculated using peak hourly flow rate Maximum static pressure: 7.5 bars in principle (there are exceptional areas) Minimum effective pressure: 2.5 bars in principle Design is prepared using Hazen-Williams Formula

37

Thank you

38

Annex2-2

Outline
For
The Study for Basic/Detailed Designs and Draft Bidding Documents
(Component B)
Under
The Project for the Study on Water Sector
for the Host Communities of Syrian Refugees
in Northern Governorates
in the Hashemite Kingdom of Jordan

December 2015

JAPAN INTERNATIONAL COOPERATION AGENCY
TEC INTERNATIONAL CO., LTD.

Following the recommendations in the master plan (MP) submitted in January 2015, study for basic/detailed design and draft bidding document will be conducted for the part of the recommended phase 1 projects. They will be prepared as reference documents for Water Authority of Jordan (WAJ). WAJ is requested to utilize these documents for implementing the project and, as a result, improving water supply situation in the area.

About the phase 1 that should be carried out by 2020 in the above-mentioned master plan, in order to promote implementation of the priority project by other donors, JICA agreed with the JORDAN government to prepare the basic/detailed designs and draft international bidding documents for reference.

1. Background of MP

1.1 Since the armed conflict in Syria in 2011 the influx of Syrian refugees has further deteriorated the condition of water supply services in Jordan and particularly in the northern governorates which already suffers from limited water resources, small amount of per capita water supply, high NRW, etc.

1.2 The MP was undertaken to identify the required improvements and priority to mitigate the poor water supply services in the Study area (Irbid and Ramtha and its suburbs) where the Syrian refugees have been largely settled in the largest urban area in the northern governorates. The MP presents a water supply development plan meeting the 2035 demand of Jordanian population, which is equivalent to the 2028 demand combining Jordanian population and the current level of Syrian refugees.

1.3 Even before the influx of Syrian refugees, Water Authority of Jordan (WAJ) has implemented the construction of transmission facilities to convey the Disi fossil groundwater nationwide. WAJ has accelerated construction of the transmission facilities terminating at Hofa reservoir in Irbid suburbs (so-called the eastern transmission mains) to narrow the gap between the increasing demand and supply. These facilities are expected to be completed by 2017 and consequently the total amount of water available for the northern governorates is expected to increase to 91 Million Cubic Meters (MCM)/year from current level of 72 MCM/year.

1.4 However, supplying 91 MCM of water/year in the northern governorates will not satisfy the demand in 2017. Therefore, WAJ has already started development of the additional 30 MCM/year water source by the “Red-Dead project”, totaling to 121 MCM/year water. This amount will be conveyed through so-called the western transmission mains and terminating at Zebdat reservoir in Irbid city. This amount would be able to meet the 2028 demand of Jordanian and Syrian refugees combined provided that the latter’s population remains at the same level

as in 2013.

2. Outline of MP

2.1 The MP intends to identify required facilities to distribute the available water to the Study Area and the following measures are proposed:

- Strengthening and restructuring of distribution system
  - Rezoning of reservoir zones
  - Strengthening of network including increase in pipe size and addition of mains
- Rehabilitation of inferior pipes (galvanized iron and old pipes)
- Distribution management for equitable supply
  - Establishment of District Metered Area (DMA)
  - Supervisory Control and Data Acquisition (SCADA)

2.2 The proposed facilities are to be implemented in 4 phases and target values for the Irbid and its suburbs are set as shown below.

Table-1 Target Values for Improvement of Service in Irbid and Its Suburbs

Indicators for improvement		Current (2013)	Target values in 2035	Required main measures
Number of "No water" complaints (equitable supply)		20,801	1,000	・ Distribution management for equitable supply ・ All measures below
Water supply pressure		0 –more than 7.5 bar	2.5 – 7.5 bar	・ Strengthening and restructuring of distribution main system ・ Distribution management
Per capita supply (liter)		82	123	・ Strengthening of distribution main system
Per capita consumption (liter)		65	104	・ Strengthening of distribution main system ・ Leakage reduction measures
Leakage ratio	Assumption	20 %	15 %	・ Replacement of inferior pipes
Leakage	Complaints	4,439	1,000	
Service population		498,800	790,200	・ Distribution management for equitable supply

2.3 The proposed facilities are to be implemented in Phase 1 between 2016 and 2020 in Irbid city and its suburbs as shown in Figure-1 and Table-2 and part of the Phase 1 works are selected for scope of the basic/detailed design and draft bidding documents preparation.

2.4 The study for basic/detailed design and draft bidding document will be conducted for the part of the recommended phase 1 projects, and the following effects are expected by implementing these projects:

- Reduction in the number of "No water" complaints (equitable supply)
- Equalization of water supply pressure
- Increase in the per capita supply and consumption
- The beneficiary population is projected about 302 thousand in 2020.

2.5 Water distribution system in Irbid and its suburbs are slightly different, depending on water amount conveyed and locations of terminal reservoirs. In case of 91 MCM/year, water will be distributed by gravity both from Zebdat (from the western transmission mains) and Hofa reservoirs (from the eastern transmission mains) except the use of 1 Zebdat pump zone.

2.6 In case of 121 MCM/year, all the water requirements of Irbid are to be obtained from the western transmission mains to Zebdat reservoir, from where most part of Zebdat will be supplied by gravity except in case of 1 Zebdat pump zone. Two high areas are proposed to be supplied water from Hofa reservoir through gravity. Water to Hofa reservoir will be pumped from Zebdat pumping station. The required facilities proposed in this Study are shown below.

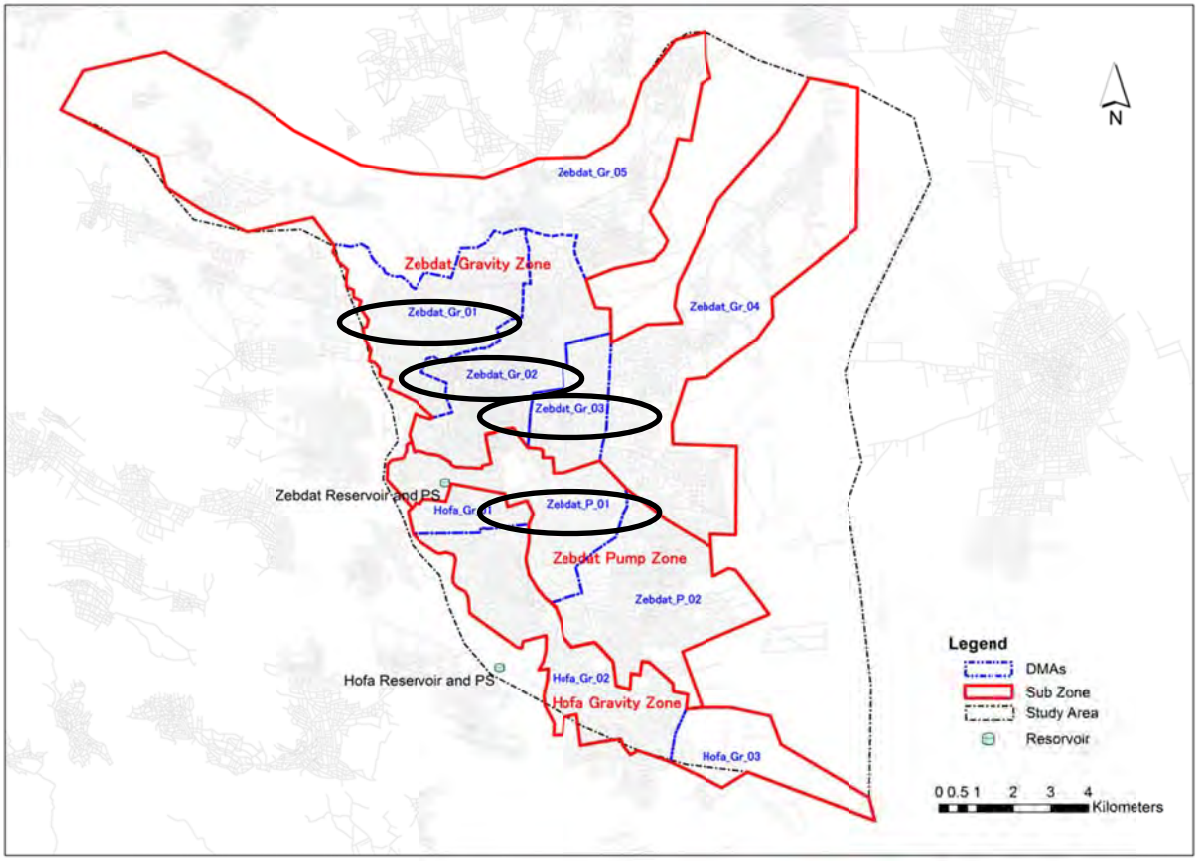


Figure-1 Proposed DMAs in Irbid and its Suburbs
(Circled DMAs are the scope of the BD/DD Study)

Table-2 Construction Costs by DMAs in Phase 1 (2016-2020) in Irbid City and Its Suburbs

Package	Description			Quantity	Unit	Construction Cost (million JD)	Total Project Cost (million JD)
1	Zebdat Transmission Pumps		Q = 732 m^3/h, H=180 m	2	sets	1.01	1.46
2	Transmission pipes (from Zebdat to Hofa)		DI 500 mm,	3,700	m	0.93	1.34
3	Zebdat Distribution Pumps		1,206 m^3/h, H=80 m	2	sets	1.32	1.91
4	Distribution pipes (Strengthening)	Zebdat Gravity 01	DI 200 -800mm	10,139	m	2.57	3.72
5		Zebdat Gravity 02	HDPE 150,DI 200-1000 mm	26,390	m	7.68	11.10
6		Zebdat Gravity 03	DI 200 -800 mm	13,245	m	7.04	10.18
7		Zebdat Gravity 04	HDPE 150,DI 200-800 mm	24,069	m	6.07	8.78
8		Zebdat Gravity 05	HDPE 150,DI 200-800 mm	27,673	m	6.29	9.09
9		Zebdat Pump 01	HDPE 150,DI 200-600 mm	11,375	m	2.35	3.40
10		Zebdat Pump 02	HDPE 150,DI 200-300 mm	6,965	m	0.92	1.33
11		Hofa Gravity 01	HDPE 150,DI 200-800 mm	3,063	m	0.54	0.78
12		Hofa Gravity 02	HDPE 150,DI 200-400 mm	12,814	m	1.57	2.27
13		Hofa Gravity 03	DI 300 mm	347	m	0.05	0.07
		Sub-total		136,080	m	35.08	50.72
14	Service pipes & House connections			10,100	Num.	3.54	5.12
15	SCADA		SCADA center	1	LS	0.24	0.35
	DMA			10	place	0.54	0.78
	Remote Station		Zebdat, Hofa	2	place	0.19	0.27
	Sub-total					0.97	1.40
	Total of Construction Cost					42.83	61.92
	Engineering Service Cost					4.28	
	Physical Contingency					4.85	
	Administration Cost					1.41	
	Project Cost					53.38	
	Value-added tax					8.54	
	Total Project Cost					61.92	

Note: For defined DMAs and its boundary, refer to Figure-1 above.
DI: Ductile Iron
HDPE: High Density Polyethylene Pipe
: Scope of The Study for Basic/Detailed Designs and Draft bidding Documents (Component B)

Minutes of Meeting held between the Study Team for BD/DD (Component B) and Technical Committee of WAJ on 17th May 2016 from 9:00 a.m.-11:30 a.m. at PMU Office, WAJ

This meeting was convened on to appraise on the progress status of the study including review of Master Plan Report and planning & design data to be considered for this study, design criteria and basic design works done so far. The list of the participants of the meeting is given in Annex 1.

At the outset, Eng. Salameh of the PMU welcomed all the participants and requested the JICA Study team (TEC International Co., Ltd.) to proceed with the presentation. On behalf of the JICA Study team, Eng. Fatimah, Team Leader of the Arabtech Jardaneh, presented the presentation. The full content of the presentation is attached as Annex 2.

The presentation went along with the discussion on the queries raised by the Technical Committee members (hereinafter referred to as "TC") and other participants of the meeting. The major points of discussion and agreement reached are presented as follows.

1. The Study team recalled on the submission of Inception Report on 6th April,2016 and Technical Memorandum (i.e. Design Criteria Report) on 11th April, 2016 earlier.

2. The study team informed that the population data of Irbid city, General Census of Population and Housing 2015, received from the Department of Statistics (DOS) for the year 2015 is 8% higher than the population projected in the Master Plan (MP) study for the same. Hence, the actual data received from DOS has been considered in this study for all kinds of calculations and projections (noting that the Syrian refugees figures will be added as a fixed number – no growth rate will be considered)

3. The TC members enquired on the basis of (or source of) the data/figures proposed for various design criteria. After due deliberation on each items, it was decided to change certain design criteria/values from the proposed ones to be as follows.

    a. Flow velocity in Gravity Pipeline Systems
        i. Minimum = 0.3 m/s
        ii. Maximum = 1.5 m/s
    b. Flow velocity in Pumping Pipeline Systems
        i. Minimum = 0.75 m/s
        ii. Maximum = 1.8 m/s
    c. Hazen-William's coefficient of friction, C value
        i. Use 110 for design purpose of both the new and old pipelines,
    d. The TC suggested to study different scenarios for Q/H for Pumps to adopt the most economical pipeline diameters for the force mains based on the provided flow and head.

4. The study team presented the suggested pipes material and class which will be used in the project and recommend to use DI pipes for diameters of 150mm and above (Class C30 and C40), TC suggested to use DI pipes K9 and they stated that this issue will be finalized later.

5. The study team presented the various alternatives being considered on DMAs including slight readjustment in the zone boundaries and creations of new DMAs. The study team clarified that this exercise is being done to make out the most economical and optimally performing networks. The TC had no objection on it. The TC also suggested to adopt the best alternative for supplying in *Beit Ras* area which are at far end from Zebdat reservoir and at higher elevations.

6. The study team inquired the TC about firefighting consideration in the drinking water network, and it was agreed that the study team will contact the civil defense in that matter.

7. The Study team asked for the opinion of TC on considering the rationing (as being practiced by WAJ currently) for demand calculation and sizing of pipes. After discussion, it was decided to not consider the rationing for hydraulic model and simulations. Hydraulic modeling and design of pipelines should be done for continuous supply case (24X7) only. However, checking should be done for the rationing conditions.

8. The TC suggested that based on the MP and current situations, the study team may present a final overview plan of water allocation and use of pipelines at various situations and time phases in future for easy understanding and reference purpose.

9. A discussion took place regarding the integration of *Hofa-Bait Ras* pipeline with the network being studied, and it was agreed that the study team's integration is acceptable through utilizing the *Hofa-Bait Ras* pipeline to strengthen the network.

Finally, the Study team informed that the Draft Basic Design Report will be submitted by the middle of June 2016. Accordingly, it was planned to meet next time in between 17 and 20th of June to discuss on the Draft BD Report.

The meeting came to a close by extending thanks to all the participants by the chair.

Both sides confirmed on the above along with Annex 1 and 2 (enclosed).
Amman, 18th May 2016

Eng. Iyad Dahiyat	Eng. Kazufumi Momose
PMU Director	Team Leader/ JICA Study Team
Water Authority of Jordan	TEC International Co., Ltd
Jordan	Japan

Eng. Salameh Mahasneh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Eng. Bashar Batayneh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Annex 1

Technical Committee Meeting
for
The Study for Basic/Detailed Design and Draft Bidding Documents (Component B)
Under
The Project for the Study on Water Sector
for the Host Communities of Syrian Refugees
in Northern Governorates
in the Hashemite Kingdom of Jordan

Date/Time： May 17, 2016/9:00-11:30
Venue ：PMU Meeting Room, Water Authority Of Jordan (WAJ)

Name List of Attendance

Name	Organization/Affiliation
KfW/AFD	
Ms.Nisreen Haddadin	KfW
Ms.Atika Ben Maid	AFD
Technical Committee	
Eng Reham Bani Hani	WAJ, Technical Committee member
Eng.Ala'a Mohsun	WAJ
Eng. Salameh Mahasneh	PMU,WAJ, Technical Committee member
Eng. Bashar Bataineh	PMU,WAJ, Technical Committee member
Eng. Udo Kachel	PMU,WAJ
Study Team	
Eng. Kazufumi Momose	TEC International Co., Ltd.(TEC), JICA Study Team Team Leader
Eng. Kiyoshi Mizufune	TEC, JICA Study Team
Eng. Sunil Kumar Karn	TEC, JICA Study Team
Eng.Makoto Homma	TEC, JICA Study Team
Eng. Jihad Abujamous	Arabtech Jardaneh Engineers and Architects (AJ)
Eng. Fatima Al Maharmah	AJ
Eng. Jomanah Al Btoush	AJ
Eng. Montaser Al Jazzazi	AJ
Eng. Osamah Alsheikhali	AJ

Name List of Absence

Name	Organization/Affiliation
Eng. Iyad Dhaiyat	PMU Director, WAJ, Steering Committee member
Eng. Khaled Abu Qamar	WAJ, Technical Committee member
Eng. Ashraf Bataineh	YWC ,Technical Committee member
Eng. Dalal Eliwah	YWC ,Technical Committee member
Eng. Bilal Rabie	YWC ,Technical Committee member

Annex 2

Technical Committee Meeting
for
The Study for Basic/Detailed Design and Draft Bidding Documents (Component B)
Under
The Project for the Study on Water Sector
for the Host Communities of Syrian Refugees
in Northern Governorates
in the Hashemite Kingdom of Jordan

Date/Time : May 17, 2016/9:00-11:30
Venue : PMU Meeting Room, Water Authority Of Jordan (WAJ)

JICA Study Team(TEC International Co., Ltd.)
In association with
Arabtech Jardaneh Engineers and Architects

The Study for Basic Detailed Design and Draft Bidding Documents (Component B)

Date: 17th May 2016

Location: MWI

Purpose: Coordination Meeting

Meeting Agenda

- Basic Design Stage
  1. Deliverables
     a. Inception Report
     b. Design Criteria
     c. Basic Design Report

Basic Design Stage

Deliverables

1. Inception Report (6th April 2016)
2. Technical Memorandum (11th April 2016)
3. Basic Design Report (in progress)
4. Preliminary Drawings (in progress)

Inception Report

Inception Report Objectives

1. Summarize the initial data collection activities and findings.
2. Present the review of the base information from the approved MP.
3. Present the detailed work plan.
4. Present a detailed project schedule and key milestones.
5. Provide a detailed staffing schedule.

Design Criteria

Main Parameters (MP)

Parameter	Unit	Value
Water losses (percentage of Q_{ave})	%	20% till 2020 15% till 2035
Average water consumption	lpcd	116 for city 88 for rural
Average water demand (till 2015)	lpcd	139 for city 106 for rural
Average water demand (till 2035)	lpcd	133 for city 101 for rural
Peak Factor		1.8

Hydraulic Design Criteria

- Hazen-Williams equation
- Roughness coefficient (C-value)

New	Old	
130	110	DI
140	110	HDPE

- Velocity

The gravity main	0.10 -1.50 m/s	< 200mm
	0.60 -2.50 m/s	≥ 200mm
The pumping main	0.75-1.80 m/s	

Pipeline Material

- **Class C30 and C40,** cement mortar lined and externally bitumen and metallic zinc coated Ductile Iron (DI) pipes are recommended for the primary pipelines with diameters of 150mm and above.
- For the distribution networks with pipe diameters less than 150 mm, it is recommended that HDPE pipes **16 bars** pressure class be used.

Basic Design Report

Updating Population and Water Demand

Population projection and water demand calculation based on:

- 2015 Statistical Report.
- Approved MP.

Population Projection

- Total population of Irbid governorate for year 2015 is more than what was pointed out in the approved MP for the same year by 8%,
- DOS doesn't published a detailed statistical report yet, the name and population projection per each district and neighborhood has been adopted from the approved MP,
- 70% of the Syrian refugees are live within the project area which will be added as a fix number to the estimated Jordanian population,

Population Projection

Population (2035)	GR-01	GR-02	GR-03	P-01
Total without Syrian Refugees	143,202	261,506	51,508	65,645
Total with Syrian Refugees	177,548	295,852	85,854	99,991

Water Demand

- Leakage ratio of 20 % up to 2020 and 15 % up to 2035 for the Average Demand,
- Additional summer factor of 17% for Maximum Seasonal Demand,
- Peak Facto of 1.8, and
- Rationing water supply for 3.5 days,

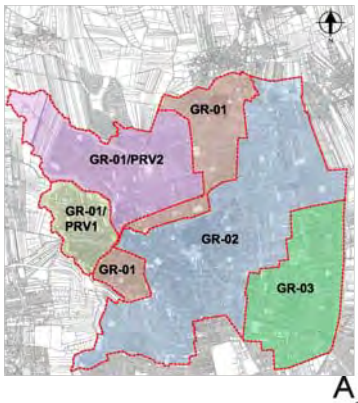
Water Demand

Zone Category	Sub Zone Number	Avg. Daily Demand (Without Refugees) m³/d	Avg. Daily Demand (With Refugees) m3/d	Max. Seasonal Demand (Without Refugees) m³/d	Max. Seasonal Demand (With Refugees) m³/d	Max. Daily Demand (Without Refugees) m³/d	Max. Daily Demand (With Refugees) m³/d
Gravity Zones	GR-01	19,103	23,132	22,351	27,064	40,231	48,716
	GR-02	34,885	38,914	40,815	45,529	73,468	81,953
	GR-03	6,871	10,900	8,039	12,753	14,470	22,955
	GR-04	10,621	14,650	12,427	17,141	22,368	30,853
	GR-05	14,794	18,823	17,309	22,023	31,156	39,641
Pump Zones	P-01	8,757	12,786	10,246	14,960	18,442	26,927
	P-02	6,222	10,251	7,280	11,994	13,104	21,589

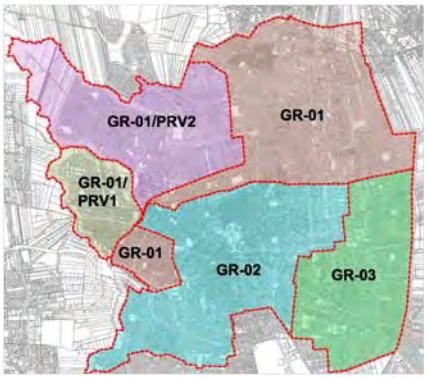
Updating Hydraulic Model

- Isolated DMAs with one feeding pipeline.
- Using updated water demand.
- Apply rationing water supply system.
- Consistency of the diameter's changing for the new 150 mm up to 1200 mm water pipelines within each DMA.
- Ensure that all new pipelines pass through accessible and planned road.

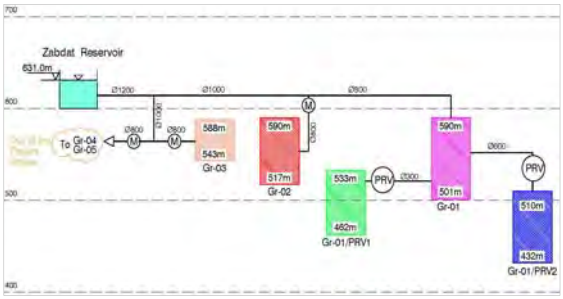
Proposed Gravity DMAs-Alternative 1



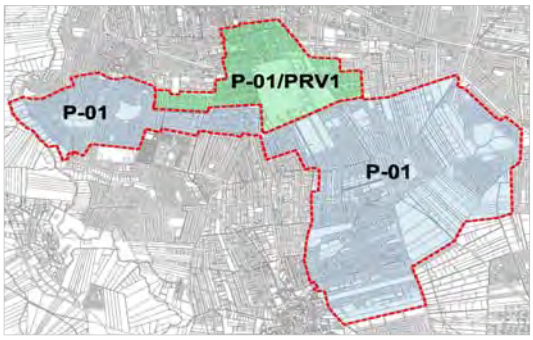
Proposed Gravity DMAs-Alternative 2



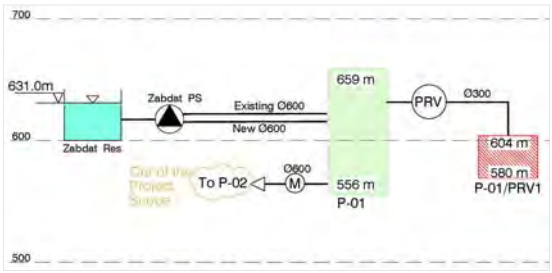
Proposed Gravity DMAs-Alternative 1,2



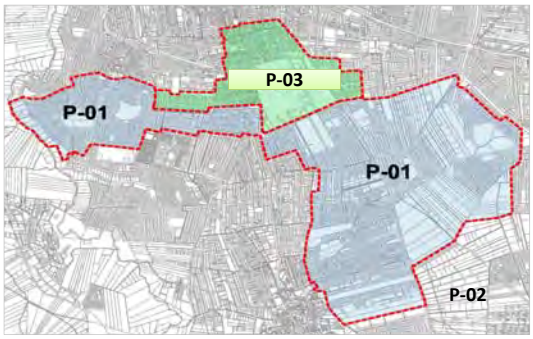
Proposed Pumping DMAs- Alternative 1



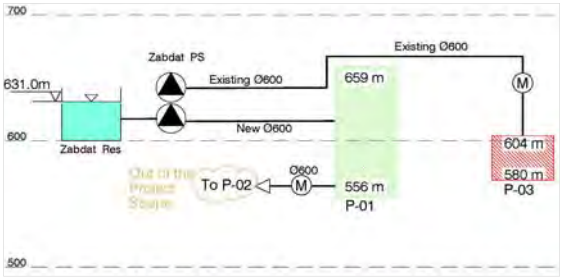
Proposed Pumping DMAs- Alternative 1



Proposed Pumping DMAs-Alternative 2



Proposed Pumping DMAs-Alternative 2



ARABTECH JARDANEH

Proposed Strengthening Pipelines-Gravity

Diameter (mm)	Length (m)
1200	1,400
1000	2,500
800	7,650
600	7,100
400	5,800
300	6,050
200	5,000
150	18,000
100	1,000
Total	54,500

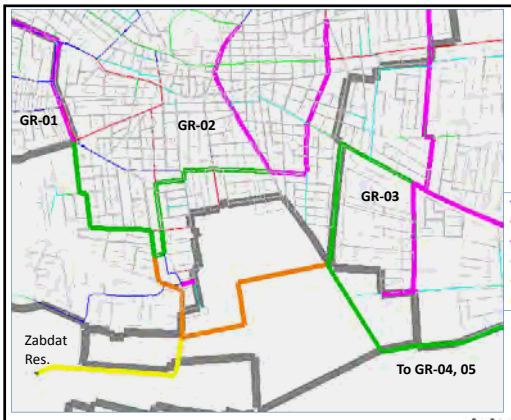
ARABTECH JARDANEH

Proposed Strengthening Pipelines-Pump System

Diameter (mm)	Length (m)
600	6,600
400	50
300	1,850
200	2,200
150	5,500
Total	16,200

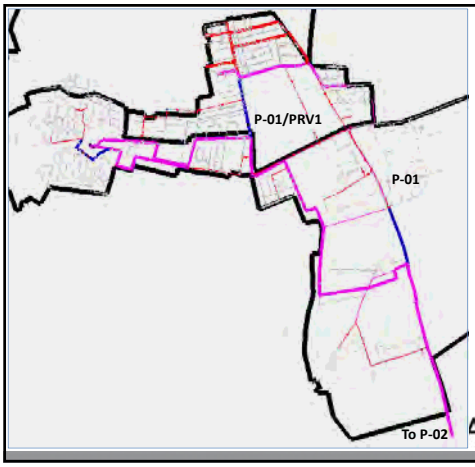
ARABTECH JARDANEH

Main Primary Pipelines-Gravity System



ARABTECH JARDANEH

Main Primary Pipelines-Pump System



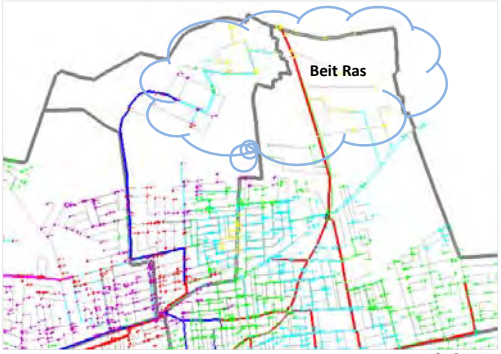
ARABTECH JARDANEH

Hydraulic Analysis Outcomes

- 80% of the junction's pressures within the adequate pressure range between 2.5 and 7.5 bars,
- 15% of the junctions at the borders of the DMAs boundaries which have no other source or at a limited areas inside DMAs with a low levels have a pressure more than 7.5 bars up to 11 bars,
- Around 5% of the junctions have a pressure less than 2.5 bars up to 1 bars at the high level areas of **Beit Ras,**

ARABTECH JARDANEH

Hydraulic Analysis Outcomes



ARABTECH JARDANEH

ARABTECH JARDANEH

Thank You

Minutes of Meeting held between the Study Team for BD/DD (Component B) and Technical Committee of WAJ on 22nd and 26th June 2016 from 9:00 a.m-12:00 noon at PMU Office, WAJ

This meeting was convened to present and explain on the details of the Draft Basic Design Report prepared by the Study Team. The list of the participants in the meetings in both days is given in Annex 1.

Proceedings of the Meeting held on 22nd June 2016:

Eng. Salameh of the PMU welcomed all the participants and requested the JICA Study team (TEC International Co., Ltd.) to proceed with the presentation. The JICA study team handed over a copy of the Draft BD Report to each of the participants. On behalf of the JICA Study team, Eng. Momose made the presentation. The full content of the presentation is attached as Annex 2.

The presentation went along with the discussion on the queries raised by the Technical Committee members (hereinafter referred to as "TC") and other participants of the meeting. The major points of discussion and agreement reached are presented as follows.

1. The study team informed that the actual census data on settled population (including non-Jordanian but excluding Syrian Refugee) of 2015 in Irbid Governorate is found to be 26.8% higher than the population projected in the Master Plan (MP). Hence this population data has been updated. However, for calculation of locality-wise population distribution and future projection up to year 2035, the data and approach of Master Plan has been used.

2. With regards to water demand calculation, the study team informed that as in the Master Plan, settled population of 2035 is only considered excluding Syrian Refugees. On this matter, most of the TC members raised a concern stating that all the Syrian Refugee are not likely to return in any event and there will be natural growth in their population too. So, at least the current population of Syrian Refugee must be counted even if that amounts to the revision in the Master Plan's concept. After a due deliberation on the matter, finally it was agreed to include the MP level (i.e. 2013 level) Syrian Refugee population as a fixed number. It was also agreed to distribute the refugee population in the proportion of settled population in each neighborhood/locality.

3. On the Hydraulic model design and results, TC members opined that the same needs to be examined in detail, hence a separate meeting can be held on some other day. Accordingly, a date of 26th June was fixed up for the discussion on the same.

4. The Study team informed that based on the basic design some of the proposed pipelines crosses through the roads under MoPWS and also passes through the narrow and congested roads. In such areas, pipe laying by trenchless methods may need to be adopted. On this matter, some TC members recalled on their recent past experiences from other projects including ongoing JICA grant-aid project wherein proposed trenchless methods were needed to be changed into open cut methods due to various reasons such as less congested

roads and less costs. Hence, it was suggested to avoid this and propose for open cut method itself for all the pipelines. After a discussion, TC members and study team agreed to follow this.

5. On Unit rate and Cost estimates, some TC members expressed that the same is very high as compared to the prevailing rates of works in WAJ. On this matter, PMU suggested that the rates of comparable projects are available in PMU and the same can be taken by the study team as a reference. The Study team agreed to it.

6. On Environmental Clearance matter, the study team informed on the present status of enquiry made to the Ministry of Environment. The PMU informed that the response of Ministry of Environment is now received and that the preliminary environmental study is required. The Study team expressed that if it is the preliminary environmental study only, the information presented in the Master Plan may be adequate. The PMU requested the study team to provide such information and assist in filling up the required forms for submission to the Ministry of Environment. The Study team agreed that necessary support will be provided through its local associate company M/s Arabtech Jardaneh.

7. On Contract packaging matter, the Study team informed that it is envisaging to propose for 4 contract packages with the areas tentatively covered under original 3 gravity DMAs and 1 pump DMA. However, the same can be slightly readjusted based on new final boundaries of the DMAs and cost allocations. The TC members agreed to it.

8. The TC members expressed that since the planning and design is for 2035, the rationing of water will still need to be continued for some years from now. Moreover, the number of DMAs has been now increased by more than 10 numbers owing to the undulations and for pressure equalization purposes including introduction of Pressure Reducing Valves. Therefore, SCADA system is necessary for the operation and control of the entire system effectively. The Study team took note of this as the variation in the scope of work is a matter to be agreed between WAJ and JICA.

Along with the matters discussed above and the changes proposed, the TC members agreed to the rest of the BD report and consented the study team to submit the revised BD report and also to progress for the next step works i.e. detailed design.

Proceedings of the Meeting held on 26th June 2016:

Eng. Salameh of the PMU welcomed all the participants and requested the JICA Study team to proceed with the presentation. On behalf of the JICA Study team, Eng. Fatimah explained on the hydraulic models and related features by projector on screen. The TC members examined on all the input parameters of the models and corresponding results. The major points discussed and the agreement reached is as follows.

9. The TC members asked to clarify on the basis of different rate of population allocation taken across the localities and future projections. The Study team explained that the same is

taken based on the government's land use plans, which is discussed in details in the Master Plan report. After due discussions, the TC asked to explain the estimation criteria and supporting land use maps in this report also. The study team agreed to it.

10. The TC members asked to clarify on the reasons for zero or low (below the set design criteria) velocities seen in the distribution pipelines. The study team clarified that the model is prepared based on existing pipelines in the field. There is apparently more number of pipes laid in the ground, which is natural over the period since old pipes are generally not removed in actual practice. This lowers the velocities in pipes. Since we are looking into the strengthening works only under this project, we can't do much at the moment. However, this situation can be improved when rehabilitation work is undertaken and also if the new connections are added up in the future. But the study team agreed to review the network once again and reduce the zero velocity situations as much as possible. The TC understood and agreed on it.
11. The TC members enquired on the flow scenario immediately after the completion of this project, say in 2018, and present such scenario based on the current demand and supply in the report. The TC members further added to present the scenario on DMA-wise rationing of water. The study team replied that the design of pipelines and especially the sizing is always done based on the demand and for the design period. We have done this in our report and for both the maximum and minimum daily flow. Others are actually various scenarios meant for understanding only, which won't have any bearing on the design works. After elaborate discussion on this matter, the study team and TC members finally agreed that the study team would give a report on such scenarios separately for reference purpose only. But the design works may be proceeded with the designed flow for the year 2035 as presented in the report.

With above agreements, the TC committee basically agreed with the proposed network design and asked for submission of the revised and final network. The TC committee also cleared for proceeding into the detailed design.

The meeting came to a close by extending thanks to all the participants by the chair.

Both sides confirmed on the above along with Annex 1 and 2 (enclosed).
Amman, 28th June 2016

Eng. Iyad Dahiyat
PMU Director
Water Authority of Jordan
Jordan

Eng. Kazufumi Momose
Team Leader/ JICA Study Team
TEC International Co., Ltd
Japan

Eng. Salameh Mahasneh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Eng. Bashar Batayneh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Annex 1

Technical Committee Meeting
for
The Study for Basic/Detailed Design and Draft Bidding Documents (Component B)
Under
The Project for the Study on Water Sector
for the Host Communities of Syrian Refugees
in Northern Governorates
in the Hashemite Kingdom of Jordan

Date/Time： June 22, 2016/9:00-12:00
Venue ：PMU Meeting Room, Water Authority Of Jordan (WAJ)

Name List of Attendance

Name	Organization/Affiliation
JICA	
Mr. Masaki Itagaki	JICA
Mr. Hani Kurdi	JICA
Technical Committee	
Eng Reham Bani Hani	WAJ, Technical Committee member
Eng. Khaled Abu Qamar	WAJ, Technical Committee member
Eng.Ala'a Mohsun Mahmoud	WAJ
Eng. Salameh Mahasneh	PMU,WAJ, Technical Committee member
Eng. Bashar Bataineh	PMU,WAJ, Technical Committee member
Eng. Udo Kachel	PMU,WAJ
Eng. Dalal Eliwah	YWC ,Technical Committee member
Eng. Kheled Santnauee	YWC
Study Team	
Eng. Kazufumi Momose	TEC International Co., Ltd.(TEC), JICA Study Team Team Leader
Eng. Kiyoshi Mizufune	TEC, JICA Study Team
Eng. Sunil Kumar Karn	TEC, JICA Study Team
Eng. Toshiaki Ruike	TEC, JICA Study Team
Eng. Fatima Al Maharmah	Arabtech Jardaneh Engineers and Architects (AJ)
Eng. Montaser Al Jazzazi	AJ
Eng. Osamah Alsheikhali	AJ

Name	Organization/Affiliation
Mr. Khalid Hilu	AJ/Trainee
Mr. Amjad Diad	AJ/Trainee

Name List of Absence

Name	Organization/Affiliation
Eng. Iyad Dhaiyat	PMU Director, WAJ, Steering Committee member
Eng. Ashraf Bataineh	YWC ,Technical Committee member
Eng. Bilal Rabie	YWC ,Technical Committee member

Technical Committee Meeting
for
The Study for Basic/Detailed Design and Draft Bidding Documents (Component B)
Under
The Project for the Study on Water Sector
for the Host Communities of Syrian Refugees
in Northern Governorates
in the Hashemite Kingdom of Jordan

Date/Time： June 26, 2016/10:00-12:00
Venue ：PMU Meeting Room, Water Authority Of Jordan (WAJ)

Name List of Attendance

Name	Organization/Affiliation
Technical Committee	
Eng Reham Bani Hani	WAJ, Technical Committee member
Eng.Ala'a Mohsun***	WAJ
Eng. Salameh Mahasneh	PMU,WAJ, Technical Committee member
Eng. Bashar Bataineh	PMU,WAJ, Technical Committee member
Eng. Dalal Eliwah	YWC ,Technical Committee member
Eng. Kheled Santnauer	YWC
Study Team	
Eng. Kazufumi Momose	TEC International Co., Ltd.(TEC), JICA Study Team Team Leader
Eng. Kiyoshi Mizufune	TEC, JICA Study Team
Eng. Sunil Kumar Karn	TEC, JICA Study Team
Eng. Toshiaki Ruike	TEC, JICA Study Team
Eng. Fatima Al Maharmah	Arabtech Jardaneh Engineers and Architects (AJ)
Eng. Montaser Al Jazzazi	AJ

Name List of Absence

Name	Organization/Affiliation
Eng. Iyad Dhaiyat	PMU Director, WAJ, Steering Committee member
Eng. Khaled Abu Qamar	WAJ, Technical Committee member
Eng. Ashraf Bataineh	YWC ,Technical Committee member
Eng. Bilal Rabie	YWC ,Technical Committee member

Annex 2

Presentation on **Basic Design report**
to the Technical Committee of WAJ/PMU

The Study for Basic/Detailed Design and Draft Bidding Documents (Component B) Under The Project for the Study on Water Sector for the Host Communities of Syrian Refugees in Northern Governorates in the Hashemite Kingdom of Jordan

Date/Time: June 22, 2016 (9:00-12:00)
Venue :PMU Meeting Room, Water Authority Of Jordan (WAJ)

JICA Study Team (TEC International Co., Ltd., Japan)
In association with
Arabtech Jardaneh, Engineers and Architects, Jordan

TEC INTERNATIONAL

ARABTECH JARDANEH
proud past . focused future

1

Topics of Presentation

1. Introduction
2. Review of Master Plan and Proposed Changes
3. Basic Plan and Design
4. Basic Design Criteria
5. Study of Roads, Traffic and Environmental Conditions
6. Components of Works and Tentative Cost Estimate
7. Implementation and Construction Plan

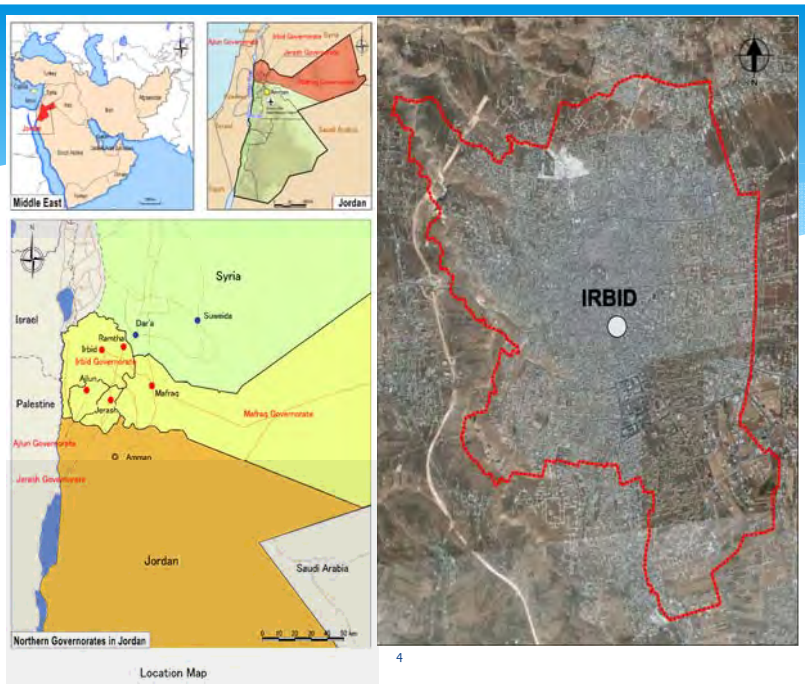
2

1. Introduction

i. Background of Study

- Since the armed Conflict in Syria in 2011, the influx of Syrian refugees further deteriorated the water supply conditions of northern governorate
- JICA undertook to prepare the Master Plan in order to identify the required improvements in Irbid, Ramtha and its suburbs.
- The Master Plan (MP) report prepared by JICA in January 2015 had recommended for carrying out certain priority works, called Phase 1 works, by 2020 to ease with the immediate shortage of water in the Irbid City and its Suburbs.
- Accordingly, JICA agreed to Jordan Government to assist in preparation of Basic and Detailed Design and Draft Bidding Documents for a part of Phase-1 works.
- The JICA assigned the job to TEC International Co., Ltd, Japan who, in turn, is carrying out the works in association with Arabtech Jardaneh of Jordan.

3



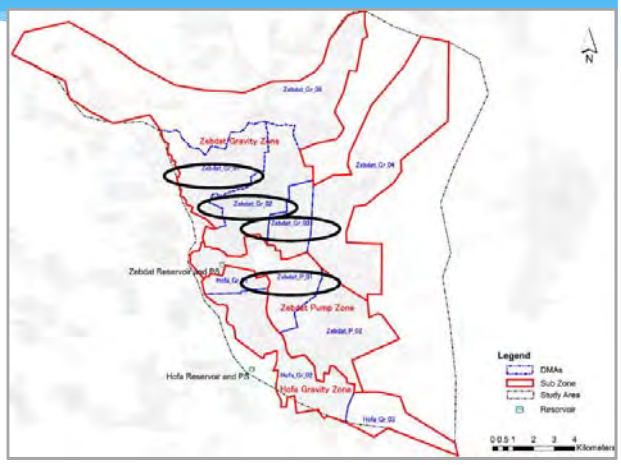
Location Map

4

Reference to the Master Plan Report

ii. Study Area

- Three DMAs namely GR-01, 02 and 03 under Gravity Supply Systems from Zebdat Reservoir
- One DMA namely P-01 of the Pumping Supply system from Zebdat Reservoir



iii. Target Year

- 2035 for Jordanian Population

5

2. Review of Master Plan and Proposed Changes

i. Data Collections

- Site Visits
- Previous Studies and Reports
- Maps and Drawings Provided by YWC
- Documents collected from line agencies (stakeholders)
  - MoPWH
  - Ministry of Municipal Affairs
  - Department of Statistics
  - Telecommunication companies

6

2. Review of Master Plan and Proposed Changes

ii. Overview of MP

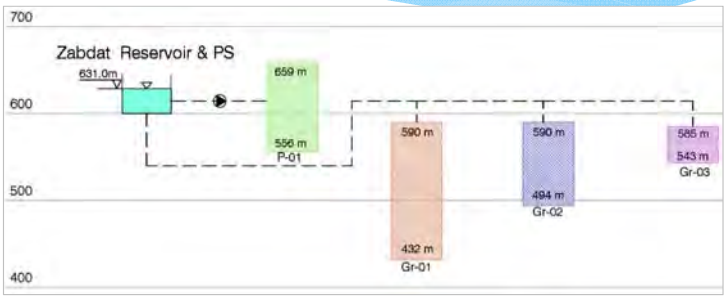
- Population Projections
  - Population adopted was based on 2004 Census
  - Population growth rate was taken as of Irbid Governorates provided by DoS
- Zoning and DMA

  3-tier System.
  - Reservoir Zone
  - Sub-Zone: Gravity and Pumping
  - District Metered Area (DMA)
    - Very large DMAs were considered considering that YWC can't manage at present

7

2. Review of Master Plan and Proposed Changes

- Hydraulic Model



  - One hydraulic analysis Scenario for 2035 considering max. demand

8

2. Review of Master Plan and Proposed Changes

- Three Proposed Outlet Pipes for gravity system from Zebdat Reservoir- one 1000 mm dia. and two 800 mm dia.
- Two Outlet Pipes for pumping system fom Zebdat Reservoir- an existing 600 mm dia. and another proposed 600 dia.
- Within three gravity DMAs, the max. elevation difference is 158 m and across pumping system it is 104 m.
- Pressure varies in between 43 m and 181 m in gravity system and in between 7.4 m and 117 m in pumping system.

9

2. Review of Master Plan and Proposed Changes

iii. Review and Findings

- Population Projections
  - Population projected for Irbid Governorate for 2015 differs from the actual census population of 2015 by approx. 26.8%
- Zoning and DMA
  - DMAs are not isolated at boundaries
  - Elevation differences within the DMA is high
  - Number of DMAs are not enough to secure adequate and equitable pressure all around each DMA

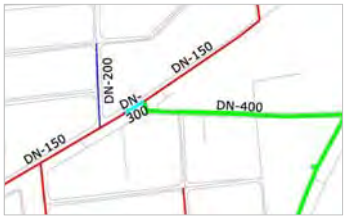
10

2. Review of Master Plan and Proposed Changes

Overlapping Pipes between the Gravity DMAs

2. Review of Master Plan and Proposed Changes

- Hydraulic Model
  - The Sequence of decreasing or increasing the diameter is not logical in some cases
  - Pressure reaches up to 18 bars in Gravity and 11 bars in Pumping DMAs
  - 3 outlet pipes proposed from Zebdat for gravity system can be reduced to a single.



12

2. Review of Master Plan and Proposed Changes

- Proposed Strengthening Pipes
  - Pipes are proposed through future planned roads

13

2. Review of Master Plan and Proposed Changes

- Proposed Strengthening Pipes
  - Large diameter pipes are passing through narrow and crowded areas

14

2. Review of Master Plan and Proposed Changes

iv. Proposed Changes

- Population Updates
  - Since the actual census data of year 2015 is available, it is proposed to adopt the same and adjust the future forecasted population
- Water Demand
  - Since Population data will be updated, water demand should also be updated.
- Zoning and DMA
  - New Zoning and DMA to be carved out which are isolated and have only one or two feeding lines

15

2. Review of Master Plan and Proposed Changes

iv. Proposed Changes

- Pipeline and Network
  - New Strengthening pipelines will be designed taking into account of the following
    - Ensure consistency in diameter changes within the new updated DMAs
    - Ensure all new pipelines pass through the accessible and planned road

16

3. Basic Plan and Design

i. Population and Water Demand Estimation
   a) Design Population
   b) Water Demand Estimation

ii. Distribution System in Irbid city and Suburbs
   a) Gravity Zones
   b) Pumping Zones
   c) Nomenclature of Distribution Pipelines

iii. Proposed Water Distribution System
   a) Hydraulic network Analysis and Design
   b) Proposed Pipelines for Strengthening

17

i. Population and Water Demand Estimation

The Population projection and water demand calculation are based on:

- 2015 Statistical Report for Population data of 2015- For Irbid Governorate
- Population data in Approved MP- For Localities

a) Design Population

- As per 2015 Census, Irbid Givernorate's Population is 1.77 miillion which is including of Syrian refugee population. Hence, syrian refugee's population is deducted to arrive at the Jordanian population only as per Table below.

Year/ Governorate	1994 Census	2004 Census	2015 Census		
			(A) Total	(B) Estimated Syrian Refugees	(C)=(A)-(B) Settled Population
Irbid	751,634	927,892	1,770,144	239,750	1,530,394

18

- The Settled Jordanian Population of 2015 Census was compared with the corresponding population in the Master Plan, and it was found to be 26.8 % higher.

Year/ Governorate	(A) 2015 Settled Population	2012 Estimated Population	(B) 2015 Estimated Population	Ratio of A/B
Irbid	1,530,394	1,137,100	1,206,700	1.268

- Since DoS hasn't published the population data of localities/ neighbourhood, the data of MP has been adopted but adjusted by multiplying with a factor of 1.268 as above.
- The above was done for all projections up to 2035 in the MP.
- Adjusted population data are presented in Table 3-3 of the BD Report

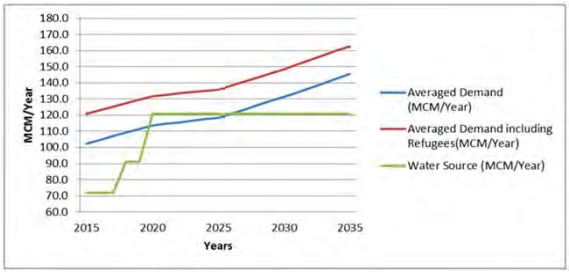
19

b) Water Demand Estimation

- Per Capita Consumption and Demand (as per MP) for Planned Period.

Area	Basic	Commercial	Industrial	Tourism	Contingency	Consumption	Leakage	Average Demand	Maximum Demand
Urban	100	3	5	3	5	116	21	137	159
Rural	80	2.4	1.6	-	4	88	16	104	121

- The Situation of Overall water demand and supply in the design period



20

- Peak Factor for max. demand = 1.8 (Seasonal 1.17 * Diurnal 1.5)
- Planned Population and Water Demands in DMAs

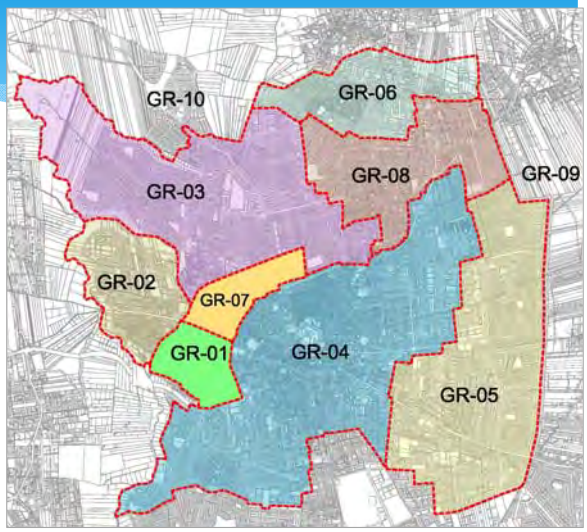
Zone Category	DMA	Population in 2035(persons)	Daily Average Water Demand in 2035 (m3/d)	Daily Maximum Water Demand in 2035 (m3/d)
Zebdat Gravity Zone	Gr-01	27,243	3,732	6,717.6
	Gr-02	24,057	3,296	5,932.8
	Gr-03	58,972	8,079	14,542.2
	Gr-04	432,029	59,188	106,538.4
	Gr-05	62,691	8,589	15,460.2
	Gr-06	13,961	1,452	2,613.6
	Gr-07	19,714	2,701	4,861.8
	Gr-08	34,420	4,715	8,487
	Gr-09	134,003	13,936	25,084.8
	Gr-10	93,583	9,733	17,519.4
	Bani Kinana	193,930	20,169	36,304.2
Zebdat Pump Zone	P-01	52,701	6,505	11,709
	P-02	20,612	2,824	5,083.2

21

ii. Distribution System in Irbid city and Suburbs

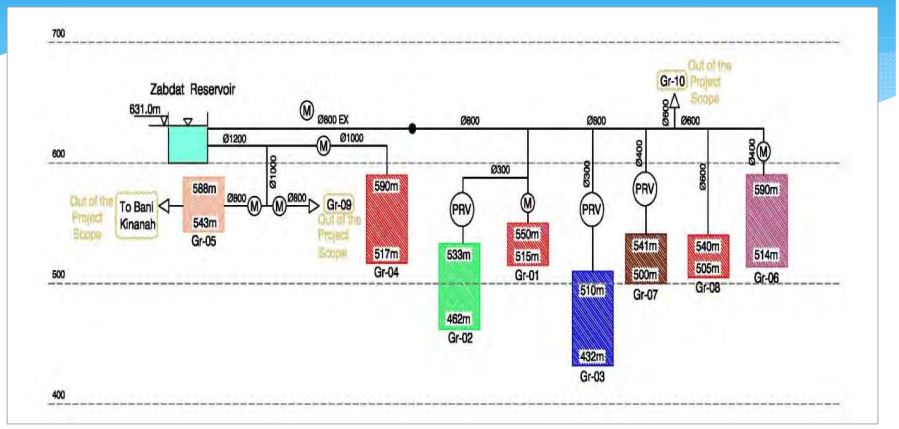
a) Gravity Zone-DMAs

- 8 DMAs in the Study Areas and 2 DMAs outside of Study area but their demand is included
- Elevation criteria to rationalize pressures
- DMAs boundaries were finalized by several trial and errors based on the network model results on pressure situation
- PRVs are inserted where necessary



22

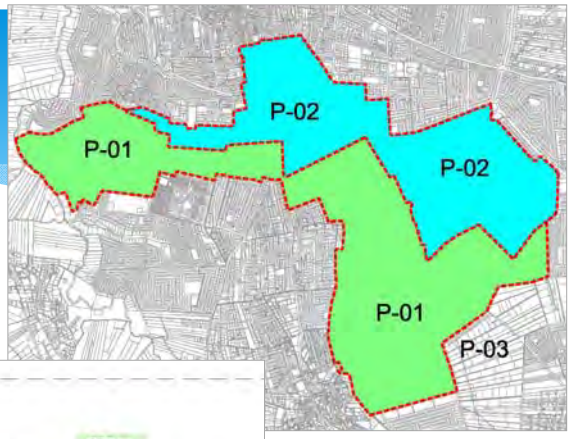
- Schematic Diagram of new Planned Gravity DMAs

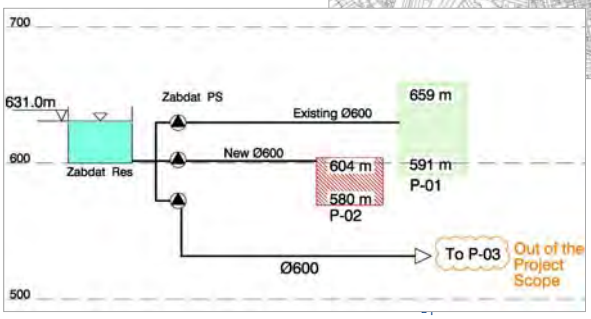


23

b) Pump Zone-DMAs

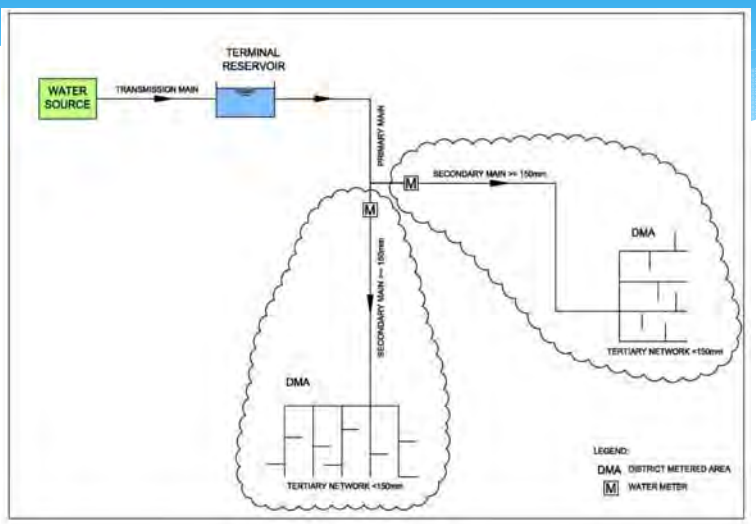
- 2 DMAs in the Study Areas and 1 DMA outside of Study area but their demand is included
- Elevation criteria to rationalize pressures





- Schematic Diagram of new Planned Pumping DMAs

c) Nomenclature of Distribution Pipes-
Schematic diagram of the classification of pipes



25

iii. Proposed Water Distribution System

i. Main Assumptions

- Only one source of supply for all the DMAs under Gravity and Pumping System
- Continuous water supply system
- Demand to the smaller pipelines are given in proportion to the Area Served
- The network is designed to meet the Design Criteria requirement

ii. Flow Scenario

- Maximum Flow Scenario
- Minimum Flow at Night – taken as 0.3 times of Maximum daily demand
- Checked for the rationing of water supply situation- alternative days supply.

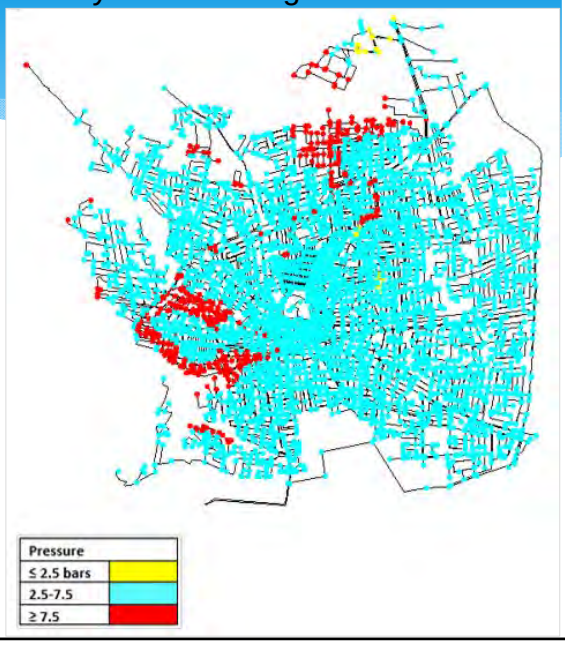
26

a) Hydraulic Network Analysis and Design

i. Maximum Flow Scenario

Gravity Systems

- 92% Junction Pressures are within the adequate range of 2.5 and 7.5 bars
- 7.7% Junction pressures goes beyond 7.5 bars but less than11 bars
- 0.3% junctions have pressure less than 2.5 bars but above 1 bar

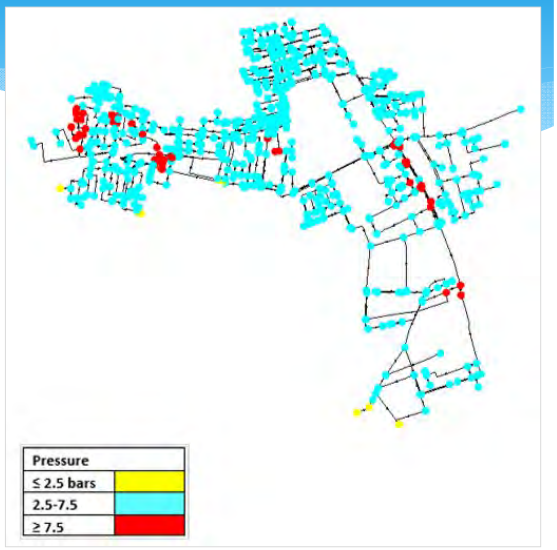


a) Hydraulic Network Analysis and Design

i. Maximum Flow Scenario

Pumping Systems

- 93% Junction Pressures are within the adequate range of 2.5 and 7.5 bars
- 6% Junction pressures goed beyond 7.5 bars but less than9.5 bars
- 1% junctions have pressure less than 2.5 bars but above 1.65 bar



28

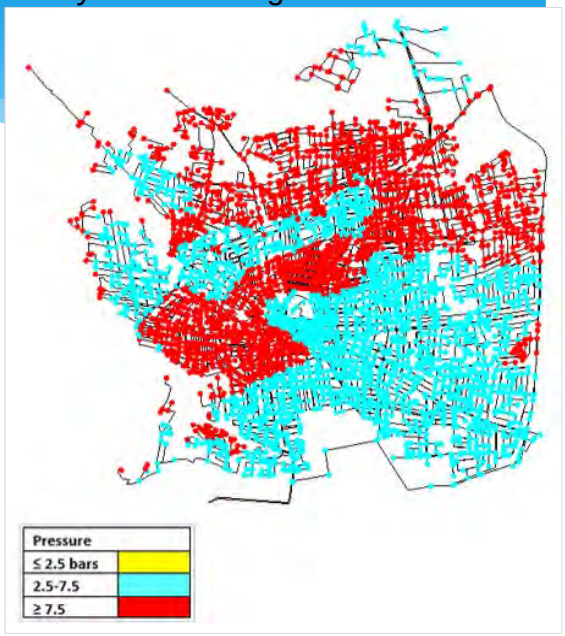
a) Hydraulic Network Analysis and Design

ii. Minimum Flow Scenario

(Avg. daily demand * 0.3)

Gravity Systems

- 60% Junction Pressures are within the adequate range of 2.5 and 7.5 bars
- 40% Junction pressures goes beyond 7.5 bars



a) Hydraulic Network Analysis and Design

ii. Minimum Flow Scenario

(Avg. daily demand * 0.3)

Pumping Systems

- 70% Junction Pressures are within the adequate range of 2.5 and 7.5 bars
- 30% Junction pressures goes beyond 7.5 bars

30

b) Proposed Pipelines for Strengthening

Gravity Systems- 8 DMAs

Diameter (mm)	Length (m)
100	1,500
150	18,500
200	8,100
300	3,550
400	4,350
600	4,050
800	10,800
1000	2,600
1200	1,900
Total	**55,350**

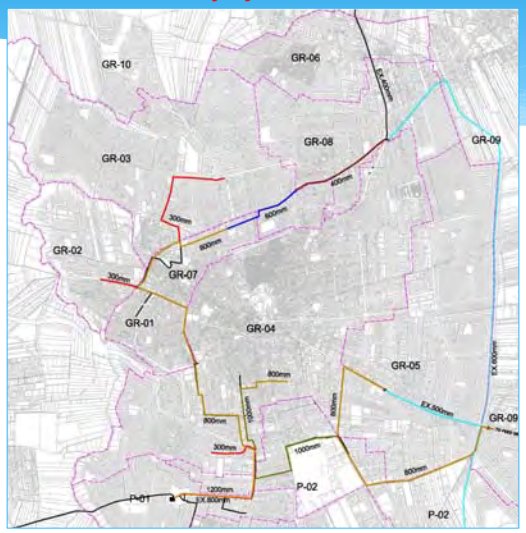
Pumping Systems- 2 DMAs

Item Description	Length (m)
100	1,000
150	7,800
200	1,950
300	600
400	1,000
600	7,000
Sub Total	**19,350**

31

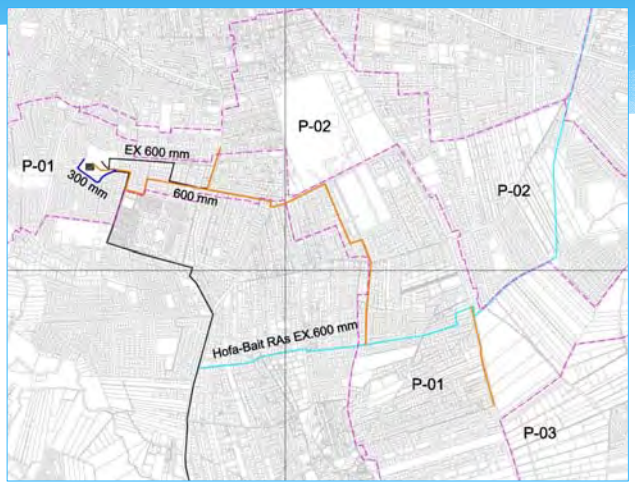
iv. Existing and Proposed Main Pipes in the Distribution System

Gravity Systems



32

Pumping Systems- 8 DMAs



33

4. Basic Design Criteria

Design Criteria is already presented and approved vide earlier TC meeting held in May 2016. The main items are presented here for quick reference purposes.

i. Design Life

Facility	Design Life (Year)
Civil Works	40
Piping Works	30
Mechanical Equipment	15

ii. Recommended Pipe Material

- Dia. 150 mm and above: DI Pipe, Class K-9
- Smaller than 150 mm: HDPE Pipe, 25 bar (Out of the scope of present study)

34

4. Basic Design Criteria

iii. Hydraulic Design Criteria

a) Flow Formula and C-Value

- Hazen-William Formula
- C Value 110 (for both Old and new proposed pipes)

b) Velocity

- Gravity main 0.3 – 1.5 m/s
- Pumping main 0.75 – 1.8 m/s

c) Pressure

- Desirable 2.5 – 7.5 bar
- Minimum 2.5 bar in principle

35

4. Basic Design Criteria

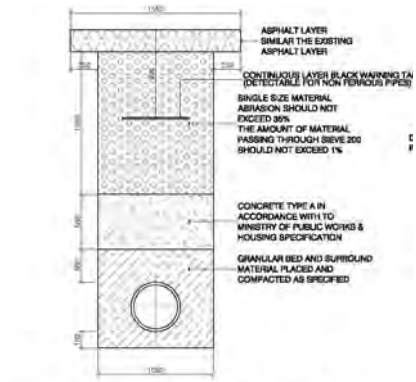
iv. Structural Design Criteria

- Expansion Joints at 20-30 m interval
- Bedding and Backfilling materials to be determined after soil investigation
- Thrust blocks as per design
- Corrosion prevention if required
- Minimum gradient for Laying-
  - 2 – 3 mm/m in the uphill
  - 4 – 6 mm/m in the downhill
- Inverted Siphon for river/ canal crossing
- Pipe jacking as per appropriate method

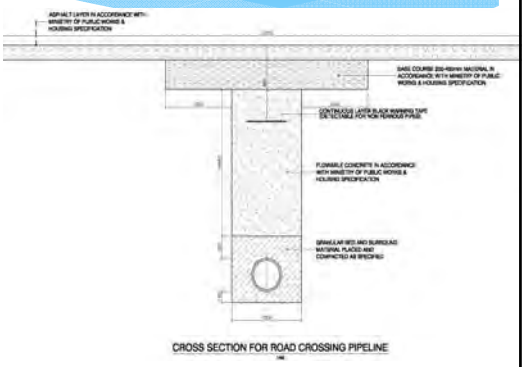
36

4. Basic Design Criteria

v. Pipeline Trenches and Cover



CROSS SECTION ALONG THE MAIN PIPELINE



CROSS SECTION FOR ROAD CROSSING PIPELINE

MoPWH Roads

37

4. Basic Design Criteria

vi. Pipe Appurtenances

a) Valves

- ❑ Isolation valves: Gate Valves for dia. Up to 300 mm and Butterfly Valve for dia. Above 300 mm.

b) Air valves

Main Pipe Diameter (mm)	Air Valve Diameter (mm)
150 - 375	65
400 - 600	100
700 - 900	150
> 900	200

c) Fire Hydrants: To be determined as per local regulations and included in pipes of 150 mm and above

38

5. Study of Roads, Traffic and Environment

i. Road Network in the Study Area

- MoPWH Roads
- Municipality Roads

39

ii. Traffic Conditions in the Study Area

- Narrow Roads especially in City Centres
- Heavy Traffic
- Commercial activities
- Underground and Ground utilities

40

iii. Environmental Considerations

a) Environmental Management Plan

- All pipeline shall be laid through the Public roads only hence no significant environmental and social impacts are anticipated
- EMP shall be prepared to be implemented during construction phase as part of the specification of the works

b) Environmental Clearance of the Project

- The study team has submitted an application to MoEnv to obtain environmental clearance for the project.
- The MoEnv's decision is awaited for further action

41

6. Components of Works and Cost Estimate

i. Major Components of Works

- Pipeline Works including appurtenances and ancillary structures
- Trenchless Installation Works
- Shifting of Public Utilities

ii. Unit rates of Pipeline Works

Basis

- Cost of materials obtained from suppliers
- Other costs like cost of delivery, bedding, backfilling etc. are estimated based on prevailing practices in Jordan

42

6. Components of Works and Cost Estimate

Unit Rates

Nominal Diameter	Excavation	Total Pipe Cost	Fittings & Chambers	Bedding & Backfilling	Road Reinstatement	Installation & Testing	Total
[mm]	[JD/m]	[JD/m]	[JD/m]	[JD/m]	[JD/m]	[JD/m]	[JD/m]
100	18	60	20	13	8	8	127
150	23	150	25	18	12	10	238
200	23	200	30	20	14	15	302
300	25	250	40	22	16	20	373
400	25	300	55	24	18	20	442
500	28	330	60	26	20	25	489
600	28	380	77	28	22	30	565
700	28	380	77	28	22	35	570
800	31	603	110	31	25	40	840
900	34	696	124	34	27	45	960
1000	37	850	130	40	29	50	1136

43

6. Components of Works and Cost Estimate

Overall Project Cost

S.N.	Items	Cost (JD)
1	Construction Cost of Gravity Systems	29,785,800
2	Construction Cost of Pumping Systems	7,912,410
3	**Sub-Total**	**37,698,210**
4	Other costs, Tax & Duties @ 30%	11,309,463
5	**Grand Total**	**49,007,673**

44

7. Implementation and Construction Plan

i. Methods for Pipeline Execution Works

- Execution of works with heavy equipment.
- Trenchless Installation
- Manual Excavation and Pipe laying

Criteria for Selection

- Road width
- Stability of the ground soil
- Adjacent buildings durability
- Traffic of the road
- Pedestrians
- Environmental Impact
- Cost
- Others

45

7. Implementation and Construction Plan

ii. Contract Packaging

Tentatively – Four packages but will be decided later on based on cost and geographical proximities

- Package 1: Gravity DMAs GR-01, 02, 03, 06, 07 and 08.
- Package 2: Gravity DMA GR-04
- Package 3: Gravity DMA GR-05
- Package 4: Pumping DMAs P-01 and P-02

46

Thank you

47

Minutes of Meeting held between the Study Team for BD/DD (Component B) and Technical Committee of WAJ on 16th August 2016 from 9:00 -10:30 at PMU Office, WAJ

This meeting was convened to present and explain on replies and some modifications prepared by the Study Team for queries on the Draft Basic Design Report (Revised) raised by the Technical Committee members (hereinafter referred to as "TC"). The list of the participants of the meeting is given in Annex 1.

At the outset, the Director of PMU welcomed all the participants and requested the Team Leader of the JICA Study team (TEC International Co., Ltd. / Arabtech Jardaneh) to proceed with the presentation and discussion matters. On behalf of the JICA Study team, Eng. Momose made the presentation. The full content of the presentation is attached as Annex 2.

The presentation went along with the discussion on the queries raised by the TC members and other participants of the meeting. The major points of discussion and agreement reached are presented as follows.

1. With respect to the low velocity and low flow issue, TC members concerned that the time of reach for water to customers become long due to the low flow velocity and the water quality is deteriorating. The study team explained that although the proposed pipelines have the velocities in the set design criteria range, the low flow velocity has arisen with the existing tertiary pipelines. Since two or more pipes are arranged on the road as a cause, the flow was distributed and then the low flow velocity has arisen. The study team added that in practice, although not all pipes are used (or active), the related investigation with this is out of scope of work in this study. After a discussion, TC members and study team agreed that the same should be conducted in the design phase of rehabilitation of pipelines.

2. The study team explains the high pressure issue in some areas, noting that this is not avoidable because the topography of Irbid city and suburbs has very high undulations and that however, in future when the DMAs will be split up into smaller and real working DMAs, this high pressure pockets can be easily let off by creating new DMAs. TC members agreed to this.

3. With regards of the low flow issue, the study team has explained that there is excessive number of pipes laid in the ground, which result in the low flow scenario in our model for continuous supply and that it is also possible that existing pipelines are designed and laid for water rationing scenario and that in addition, in case the demand increases in future, say beyond the projected rate, then also the situation would get better and better as the pipes would be catering to the increased demand and flow. TC members agreed to this.

4. On the Rationing scenario, the study team mentioned that hydraulic analysis with "tank models" will not be conducted as agreed in the previous Technical Committee meeting

and that alternatively, a network analysis on rationing scenario will be examined based on the ideas, namely, i) demand of each block (combined DMAs) should be as equal as possible, ii) flows in the three (3) primary mains (for the gravity system) should be as equal as possible in order to maintain positive pressure as much as possible even under the rationing system. TC members agreed to this.

5. The study team explained main modifications on the basic design, showing changes on diameters of some pipelines for Gravity & Pumping Systems, schematic diagrams & primary and secondary mains of both systems. TC members agreed to this.

6. Other matters: i) TC members asked future actions. The study team replied that the detailed design will be conducted based on the basic design and alignments of proposed pipelines might be modified subject to the site conditions accordingly. ii) Regarding the format of the tender documents, in which WAJ shall provide the study team with a standardized sample for the plans and profiles to be developed accordingly. iii) TC members requested the study team to consider incorporating test pits as part of the contractors' works within the tender documents. The criteria will be discussed with WAJ at a later stage. iv) TC members mentioned that the accuracy of the survey using GPS shall be noted since there are sometimes accuracy problem. v) TC members requested the study team to add length of main pipelines etc. in the schematic diagram in the final detailed design report.

With above agreements, the TC committee agreed with the Basic Design Report, Draft Report (Final).

The meeting came to a close by extending thanks to all the participants by the chair.

Both sides confirmed on the above along with Annex 1 and 2 (enclosed).

Amman, 22nd August 2016

Eng. Iyad Dahiyat
PMU Director
Water Authority of Jordan
Jordan

Eng. Kazufumi Momose
Team Leader/ JICA Study Team
TEC International Co., Ltd
Japan

Eng. Salameh Mahasneh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Eng. Bashar Bataineh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Annex 1

Technical Committee Meeting
for
The Study for Basic/Detailed Design and Draft Bidding Documents (Component B)
Under
The Project for the Study on Water Sector
for the Host Communities of Syrian Refugees
in Northern Governorates
in the Hashemite Kingdom of Jordan

Date/Time : August 16, 2016/9:00-10:30
Venue : PMU Meeting Room, Water Authority Of Jordan (WAJ)

Name List of Attendance

Name	Organization/Affiliation
JICA	
Mr. Tsutomu Kobayashi	JICA
Mr. Hani Kurdi	JICA
Technical Committee	
Eng. Iyad Dhaiyat	PMU Director, WAJ, Steering Committee member
Eng. Khaled Abu Qamar	WAJ, Technical Committee member
Eng. Reham Bani Hani	WAJ, Technical Committee member
Eng. Salameh Mahasneh	PMU,WAJ, Technical Committee member
Eng. Bashar Bataineh	PMU,WAJ, Technical Committee member
Study Team	
Eng. Kazufumi Momose	TEC International Co., Ltd.(TEC), JICA Study Team Team Leader
Eng. Kiyoshi Mizufune	TEC, JICA Study Team
Eng. Takuro Kohara	TEC, JICA Study Team
Eng. Fatima Al Maharmah	Arabtech Jardaneh Engineers and Architects (AJ)
Eng. Osamah Alsheikhali	AJ

Name List of Absence

Name	Organization/Affiliation
Eng. Ashraf Bataineh	YWC ,Technical Committee member
Eng. Dalal Eliwah	YWC ,Technical Committee member
Eng. Bilal Rabie	YWC ,Technical Committee member

Annex 2

Presentation on Water Design report
to the Technical Committee of WAJ/PMU

The Study for Basic/Detailed Design and Draft Bidding Documents (Component B) Under The Project for the Study on Water Sector for the Host Communities of Syrian Refugees in Northern Governorates in the Hashemite Kingdom of Jordan

Date/Time: Aug 16, 2016 (9:00-12:00)
Venue :PMU Meeting Room, Water Authority of Jordan (WAJ)

JICA Study Team (TEC International Co., Ltd., Japan)
In association with
Arabtech Jardaneh, Engineers and Architects, Jordan

TEC INTERNATIONAL

ARABTECH JARDANEH

Topics of Presentation

Basic Plan and Design

I. Low Velocity issue
II. High Pressure Issue
III. Low Flow
IV. Rationing Scenario
V. Main Modifications

I. Low Velocity issue (1)

In accordance to hydraulic criteria design for the determination of pipe diameter clause 4.4.2 regarding velocity in the gravity main (0.3- 1.5 m/s) by checking the hydraulic model for Irbid city it has been found that the velocity in some pipes is much less than the criteria range and in many pipe the concept of the economical diameter was not applied and achieved.

a. In gravity main
- Cases of velocity less than criteria range ※
- Cases on uneconomical Diameters ※

b. In pump main
- Cases of velocity less than criteria range ※

※ Omission

I. Low Velocity issue (2)

a. In gravity main

Re: Cases of velocity less than criteria range

- These cases listed in a table are all for the existing pipes. It is observed that there is excessive number and/or oversized pipes laid in the ground which results in the low velocities in certain pipes.

✓ Generally removal of or plugging in the existing pipelines is not considered under rehabilitation programs due to cost inputs.
✓ Secondly, since the rationing of water is still, the actual velocities would be higher than what is seen in the model results.
✓ Overall, as this study is for pipe strengthening purposes only, such things are to be looked into by WAJ/YWC in future.

I. Low Velocity issue (3)

a. In gravity main

Re: Cases of velocity less than criteria range

- For new proposed pipelines, 91% of pipes (by lengths) of diameter 400 mm or more and 77.2% of pipes (by length) below 400 mm diameters have the velocities in the set design criteria range.
- For the remaining pipes, higher diameters (that lowers the velocities) are proposed taking into account of ensuring consistency in the diameter changes along the pipeline.

Re : Cases on uneconomical Diameters
- For one case, already an optimal velocity. For another case, it may be reduced.

b. In pump main

Re: Cases of velocity less than criteria range

- These cases are all existing pipes.

I. Low Velocity issue (4)

Changes made in the pipe sizes

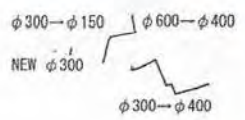
Checked thoroughly for all the proposed pipelines in gravity system for:

✓ velocity and economic sizing while still meeting the other criteria viz.
✓ acceptable pressure range and,
✓ consistency in the sizes of pipelines in contagious reach.

1

I. Low Velocity issue (5)

Changes made in the pipe sizes



Checked thoroughly for all the proposed pipelines in gravity system for:

- ✓ velocity and economic sizing

while still meeting the other criteria viz.

- ✓ acceptable pressure range and,
- ✓ consistency in the sizes of pipelines in contagious reach.

Studied different scenarios for Q/H for Pumps to adopt the most economical pipeline diameters
(Minimize Pipe cost+ Pump Cost +Energy Cost)

II. High Pressure Issue (1)

We know that the pressure can exceed 7.5 bar duo to site condition, but according to the pressure lay out there is many sites were the pressure exceed 7.5 bar.

II. High Pressure Issue (2)

- 9% of the junction's pressures, weighted by water demand, at the borders of the DMAs boundaries which have no other source or at limited areas inside DMAs with low levels have a pressure more than 7.5 bars up to 11 bars.

II. High Pressure Issue (3)

practically this doesn't make much difference and become a critical issue to the pipeline especially when the majorities of pipelines are either DI or PE (16 bar).

- The topography of Irbid city and suburbs has very high undulations.
- We have tried with several ways of DMA creations/ demarcations but some high pressure pockets remains in each case.
- Therefore, this seems unavoidable at the moment.
- However, in future when the DMAs will be split up into smaller and real working DMAs, this high pressure pockets can be easily let off by creating new DMAs.

II. High Pressure Issue (4)

- 4% of the junction's pressures, weighted by water demand, at the borders of the DMAs boundaries or at limited areas inside DMAs with low levels have a pressure more than 7.5 bars up to 9.2 bars.

III. Low Flow (1)

Why the flow is low regarding to the pipes' diameter in so many location at the end and the middle of network?

III. Low Flow (2)

- there is excessive number of pipes laid in the ground, which result in the low flow scenario in our model for continuous supply.
- It is also possible that existing pipelines are designed and laid for water rationing scenario.
- If so, this will help in actual practice as the rationing may continue for some time in future.
- In case the demand increases in future, say beyond the projected rate, then also the situation would get better and better as the pipes would be catering to the increased demand and flow.

IV. Rationing Scenario (1)

- Could you please send us the results of rationing scenario as it is not in the report (mainly pressure situation, time of filling the tanks)?
- How is the basis of this calculation (assumptions, methodology):
  - How much tanks with which volume did you take into consideration?
  - In which way did you use Water Cad for the situation of the filling of the empty network?

IV. Rationing Scenario (2)

- It has not been analyzed yet. As per suggestion in the Technical Committee meeting, we will conduct a network analysis on rationing scenario (twice a week supply) and the results will be submitted separately.
- Water demand for rationing scenario is taken as 3.5 (peak factor) of the average daily demand considering that the supply would be given twice a week for 24-hours duration each time.
- We will not conduct a hydraulic analysis with "tank models" as agreed in the Technical Committee meeting.
- Alternatively, we will examine a network analysis on rationing scenario (twice a week supply) with peak factor of 3.5 (twice a week supply) for the pipe routes and sizes that are determined based on the continuous flow with peak factor of 1.7.

IV. Rationing Scenario (3)

- Naturally, low pressures areas are expected because differences of peak factor of 3.5 (rationing system) and 1.7 (continuous supply).
- Therefore, in order to maintain positive pressure as much as possible even under the rationing system, we will suggest YWC operation staff the combination of DMAs into 3 blocks.
  - ✓ A block supply on Monday and Thursday,
  - ✓ B block supply on Tuesday and Friday and
  - ✓ C block supply on Wednesday and Saturday)

IV. Rationing Scenario (4)

- The attached combination is an example based on the followings:
  - ✓ Demand of each block should be as equal as possible.
  - ✓ Flows in the three (3) primary mains should be as equal as possible.
- Based on the above, we will conduct a network analysis on rationing scenario (twice a week supply) and the results will be submitted separately.

IV. Rationing Scenario (5)

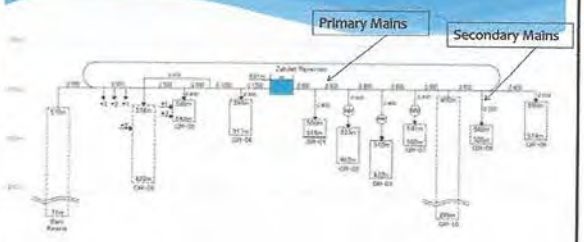
An Example of Combination

		GRAVITY				PUMP	Total
		WEST	EAST	CENTRAL			
A block	GR-01	4,005	GR-08	5,259		P-02 3,198	35,859
	GR-02	3,924	GR-09	14,127			
	GR-03	5,408					
	S.T	17,355	S.T	19,386	S.T -	S.T 3,198	
B block	GR-07	8,674	GR-05	9,672		P-01 7,044	37,877
			Rest Rivana	12,587			
	S.T	8,674	S.T	22,259	S.T -	S.T 7,044	
C block	GR-10	10,217	GR-06	1,508	GR-04 25,649		37,424
	S.T	10,217	S.T	1,508	S.T 25,649	S.T -	
Total		36,246		43,153	25,649	10,242	110,360

v. Main modifications (1) Gravity Zone- DMAs

- 8 DMAs in the Study Areas and 2 DMAs outside of Study area but their demand is included
- Elevation criteria to rationalize pressures
- DMAs boundaries were finalized by several trial and errors based on the network model results on pressure situation
- PRVs are inserted where necessary

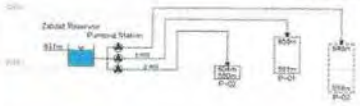
V. Main modifications (2) Schematic Diagram of Gravity System



V. Main modifications (3) Primary and Secondary Main Pipes in the Gravity System System

V. Main modifications (4) Zone-DMAs & Schematic Diagram of pumping System

- 2 DMAs in the Study Areas and 1 DMA outside of Study area but their demand is included
- Elevation criteria to rationalize pressures



V. Main modifications (5) Primary and Secondary Main Pipes in the pumping System

Thank you

Minutes of Meeting held between the Study Team for BD/DD (Component B) and Technical Committee of WAJ on 12th October 2016 from 10:00 -11:00 at PMU Office, WAJ

This meeting was convened to confirm some key points and proceed with further step on the Draft Detailed Design and Bidding Documents. The list of the participants of the meeting is given in Annex 1.

At the outset, Eng. Salameh of the PMU welcomed all the participants and requested the JICA Study team (TEC International Co., Ltd. and local associate consultants M/s Arabtech Jardaneh Engineers and Architects) to proceed with the presentation. The presentation was given by the Study Team namely Team Leader Momose and Dr. Sunil on different aspects of the Project and the Study. The full content of the presentation is attached as Annex 2.

The presentation went along with the discussion on the queries raised by the Technical Committee members (hereinafter referred to as "TC") and other participants of the meeting. The major points of discussion and agreement reached are presented as follows.

1. Progress & Schedule
   - Submission of Draft Bidding Documents by the end of October, 2016
   - Review of documents by WAJ, AFD, KFW in three weeks after submission
   - Documents to be finalized after that

2. Changes occurred after Basic Design Stage
   The JICA study team presented on some changes occurred based on joint field verification (YWC and JICA study team) and requests from YWC officials. The JICA study team also informed that the detailed design has been already carried out based on the changes. The major items of change are as follows.
   - Change in pipe alignment of western primary main of gravity system at some stretches and change in pipe diameters in some other areas. These are required for avoiding the crowded roads and roads with many utilities. Similarly one of the proposed pipelines has been deleted as YWC has already laid the same pipeline. The TC members acknowledged on the changes.
   - In an earlier meeting, the YWC officials had proposed for providing two outlet pipes from Zebdat reservoir. However after careful study of the hydraulics and road conditions at the site, JICA study team proposed to remain with the single pipe (1200 mm) earlier proposed. After discussion, TC members including YWC officials agreed to the same. Hence, it was decided to not to make changes in this regard.
   - In an earlier meeting, the YWC officials had requested for inclusion of replacement of an existing pipe (600 mm) of about one kilometer length in the pumping main. The reason is that the pipeline being old, was leaked frequently over recent years and a part of the same also passes through the private land. It was also noted that some part of it has been already replaced by YWC and the remaining portion is due.

After discussion, TC members and the JICA study team agreed to include under the scope of this project.

3. Drawings Templates: The JICA study team presented on the templates of the drawings (plans and profiles) being prepared. The TC members acknowledged on the same.

4. Bidding Procedure, Conditions of Contract and Specifications

The JICA study team stated that in order to prepare the Bidding documents, certain vital information and conditions related to bidding procedures and conditions of contracts are to be given or confirmed by Employer and funding agencies (WAJ, AFD and KFW). Accordingly, JICA study team put forwarded some queries and the response or confirmation given by TC and/or concerned agencies are as follows.

1) For Bidding Procedure and Conditions of Contract sections, AFD standard bidding document shall be used.
2) The given AFD bidding document is "Procurement of Works with Significant Environmental and Social Impacts". However, normally Water supply projects are not considered under significant environmental impact category. On this, the AFD officials said that they will convey their opinion on this matter in few days.
3) Post qualification bidding approach will be used instead of prequalification to save time. There shall be three (3) contract packages, two in gravity systems and 1 for pumping system. The two packages in gravity system shall be made such that they can function independently as far as possible.
4) Bidder's Qualification Criteria: It was decided that depending on the estimated cost of each packages, the JICA study team may propose for the suitable criteria and the WAJ, AFD, KFW shall give their responses/feedback after review. It was also decided that Jordanian Class A contractors who meets the specified criteria may also be allowed. A tentative agreement was made on follows.
    - Cash Flow requirement: USD 5 Million
    - Average Annual Construction Turnover for the last 5 years: USD 10 Million
    - General Construction Experience: 10 years
    - Specific (Similar) Experience: 2 contracts each of USD 4 million within last 10 years (Water Networks or Water Conveyors Contracts).
    - Project Manager: B. Tech (Civil), Overall experience 15 years, water supply 10 years, English fluent.
5) Preference to domestic Bidders: NO.
6) Alternative Completion Time: NO.
7) "Schedule of Particulars" specifying Manufacturer/Make and Source are to be quoted in Bid.
8) The Contract Price shall be a Fixed Price Contract
9) The Bid price shall be exclusive of taxes
10) Contract Data:
    - Time of Completion: 2 years
    - Limitations in Engineer's Duties and Authority: As per standard practice
    - Performance Security: 10%

- Delay damages rate: To be specified based on Government Tenders Directorate regulations
- Maximum delay damages: 15%
- Advance payment: 10% (in two equal installments)
- Repayment amortization rate: 20%
- Retention money: 10%
- Arbitration law of country and place: Jordan

All above shall be subject to review and modification by the client and the donors.

5. Pipe Appurtenances and Materials
   - JICA study team showed a general arrangement of DMA entry point Control Valves, Pressure Reducing Valves and Flowmeters.
   - JICA study team informed that MPWH road crossings by trenchless technology is being considered for 3-4 places only on outer region of Irbid city.
   - JICA study team asked for the confirmation on DI pipe material giving reference to the K-9 class which was decided during Basic design stage. On this matter, after discussion TC decided to go with the European Standards with C-series, which specifies based on pressure requirement. Accordingly, 150mm and above pipes shall be DI pipe (C-40, 30 and 25) with cement mortar lining internally and Zinc-Aluminium alloy with epoxy coating externally. Similarly below 150mm pipes shall be HDPE (PN 16 bar).
   - With regard to the pipe connection arrangements at Zebdat reservoir, the JICA study team informed that the matter is still under study and investigation. So this will be reported in the draft bidding documents.
   - TC members strongly expressed that the Central SCADA system should be included in the Project for operation and control of the distribution system.
   - The JICA study team clarified that the pumps and pumping station works at Zebdat reservoir are out of the scope of this project.

The meeting came to a close by extending thanks to all the participants by the chair.

Both sides confirmed on the above along with Annex 1 and 2 (enclosed).
Amman, 12nd October 2016

Eng. Iyad Dahiyat
PMU Director
Water Authority of Jordan
Jordan

Eng. Kazufumi Momose
Team Leader/ JICA Study Team
TEC International Co., Ltd
Japan

Eng. Salameh Mahasneh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Eng. Bashar Bataineh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Annex 1

Technical Committee Meeting
for
The Study for Basic/Detailed Design and Draft Bidding Documents (Component B)
Under
The Project for the Study on Water Sector
for the Host Communities of Syrian Refugees
in Northern Governorates
in the Hashemite Kingdom of Jordan

Date/Time：October 12, 2016/10:00-11:00
Venue ：PMU Meeting Room, Water Authority Of Jordan (WAJ)

Name List of Attendance

Name	Organization/Affiliation
JICA/ AFD/ KfW	
Mr. Furuya.Ryosuke	JICA
Mr. Hani Kurdi	JICA
Mr. Frederic Maurel	AFD Paris
Ms. Atika Ben Maid	AFD
Mr. Jonas Rathfelder	KfW Frankfurt
Dr. Stefan Gramel	KfW Frankfurt
Ms. Nisreen Haddadin	KfW
Technical Committee	
Eng. Khaled Abu Qamar	WAJ, Technical Committee member
Eng. Ala'a Muhsan Mohmmend	WAJ
Eng. Salameh Mahasneh	PMU,WAJ, Technical Committee member
Eng. Bashar Bataineh	PMU,WAJ, Technical Committee member
Eng. Udo Kachel	PMU,WAJ
Eng. Ashraf Bataineh	YWC ,Technical Committee member
Eng. Dalal Eliwah	YWC ,Technical Committee member
Eng. Kheled Shatnayi	YWC
Eng. Hassan Obeidat	YWC
Study Team	
Eng. Kazufumi Momose	TEC International Co., Ltd.(TEC), JICA Study Team Team Leader
Eng. Kiyoshi Mizufune	TEC, JICA Study Team

Name	Organization/Affiliation
Eng. Takuro Kohara	TEC, JICA Study Team
Dr. Sunil Kumar Karn	TEC, JICA Study Team
Eng. Jomanah Al Btouch	Arabtech Jardaneh Engineers and Architects (AJ)
Eng. Osamah Alsheikhali	AJ
Eng. Montaser Al Jazzazi	AJ

Name List of Absence

Name	Organization/Affiliation
Eng. Reham Bani Hani	WAJ, Technical Committee member
Eng. Bilal Rabie	YWC ,Technical Committee member

Annex 2

Presentation on **Draft Detailed Design and Bidding Documents**
to the Technical Committee of WAJ/PMU

The Study for Basic/Detailed Design and Draft Bidding Documents (Component B) Under The Project for the Study on Water Sector for the Host Communities of Syrian Refugees in Northern Governorates in the Hashemite Kingdom of Jordan

Date/Time: Oct 12, 2016 (10:00-12:00)
Venue :PMU Meeting Room, Water Authority of Jordan (WAJ)

JICA Study Team (TEC International Co., Ltd., Japan)
In association with
Arabtech Jardaneh, Engineers and Architects, Jordan

TEC INTERNATIONAL

ARABTECH JARDANEH
proud past . focused future

Agenda

1. Pipeline Alignment
2. Drawings
3. Bidding Procedure, Conditions of Contract and Specifications
4. Appurtenances

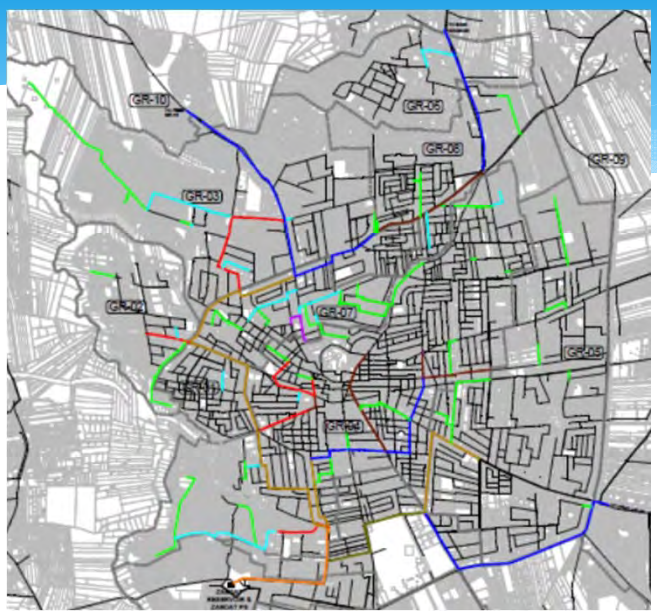
2

1. Pipe Alignment

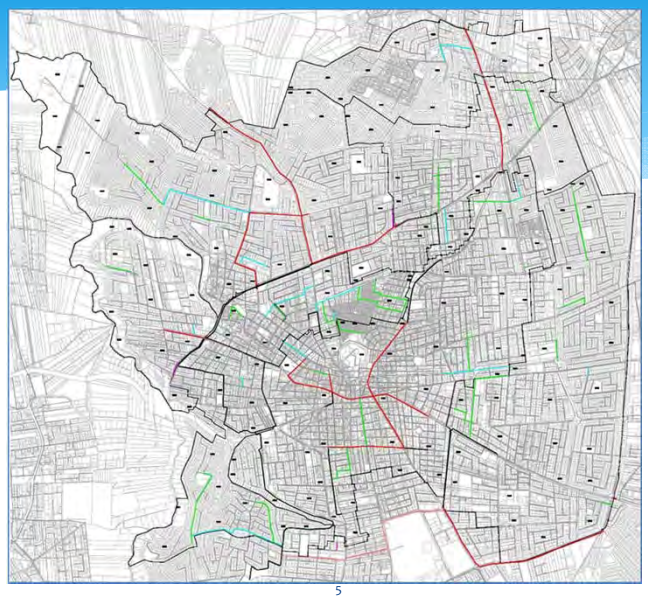
1-1. Changes occurred

3

Gravity System(Basic Design)

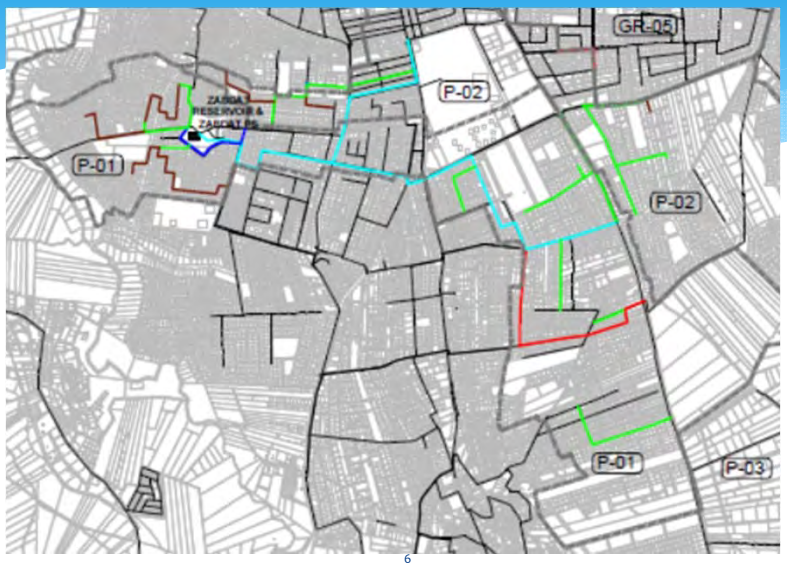


Gravity System(Detailed Design)



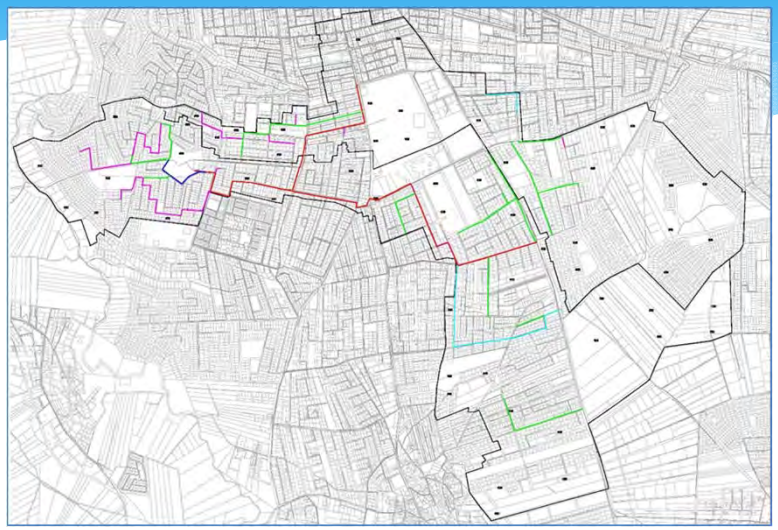
5

Pump System(Basic Design)



6

Pump System(Detailed Design)



7

1-2. Reasons for Change

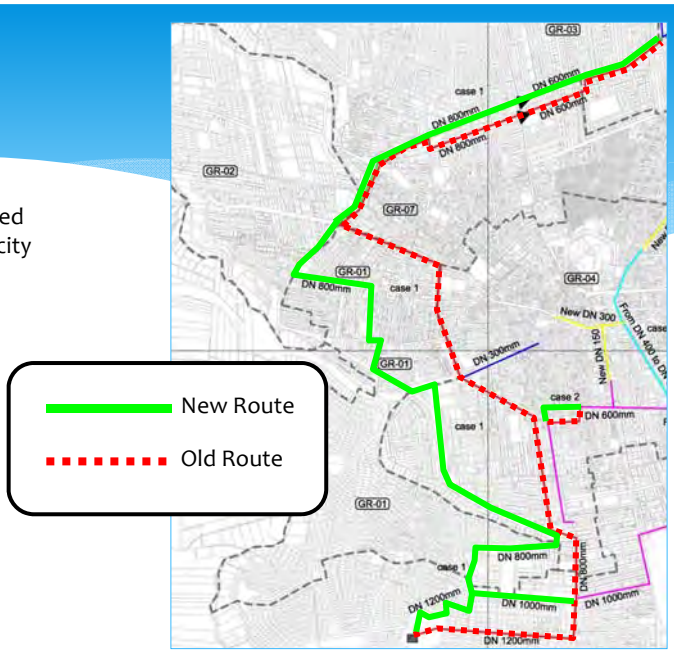
a. Avoid crowded roads
b. Avoid roads with many utilities
c. change of diameter and Additional pipelines to strengthening the water network in the city center
d. Delete the proposed pipeline due to existence of an existing pipeline

New proposal from YWC

e. Two new outlet pipes for gravity system
f. Replace existing pipe for pump system

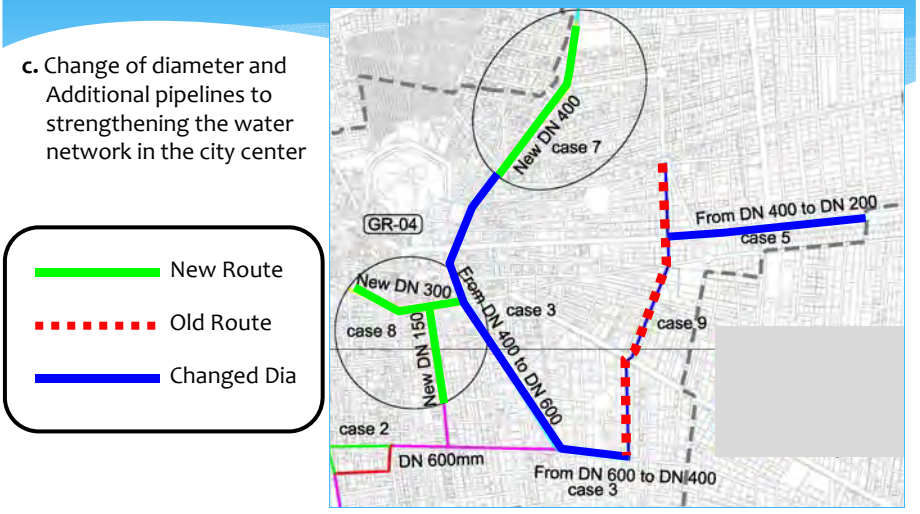
8

a. Avoid crowded roads in the city center



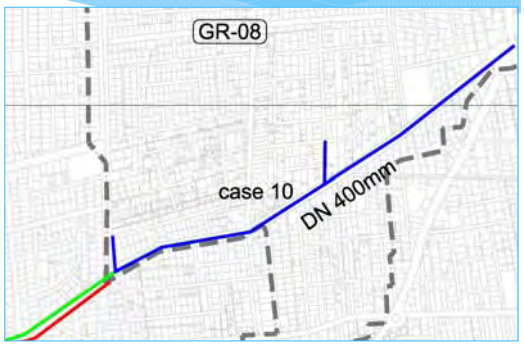
9

c. Change of diameter and Additional pipelines to strengthening the water network in the city center



10

d. Delete the proposed pipeline due to existence of an existing pipeline (constructed or under constructing) with the same diameter which is in a good condition and under operation



11

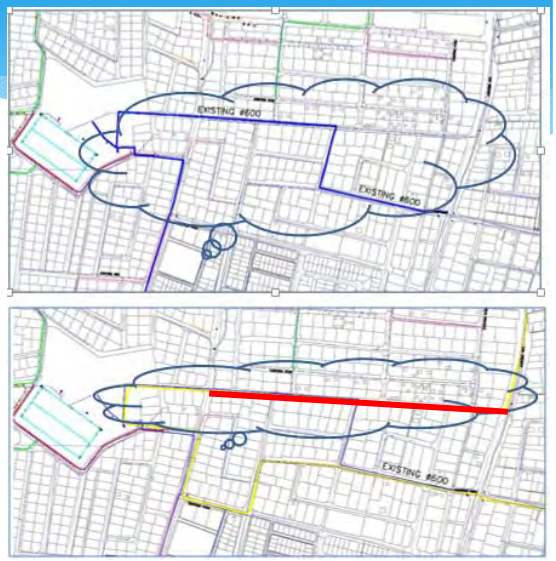
e. Suggestion from YWC to Replace the new outlet 1,200mm (Length = 800m) pipeline with two 1,000 mm outlet.

We feel single is better.
One new 1200mm pipe and one exsiting 800mm pipe.

12

f. Replacement of the existing 600mm pipe out from the existing pump station with a new 400 mm due to the following reasons:

1. Part of the existing pipeline passed under a private and existing houses
2. Old pipe and Leakage problems.



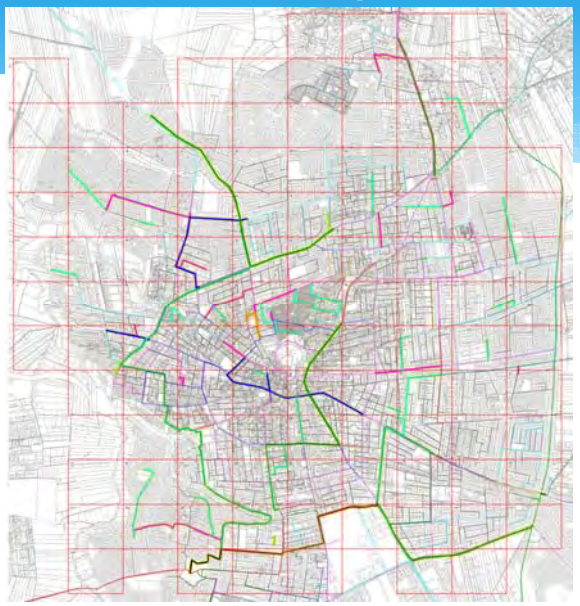
13

2. Drawings (Sample)

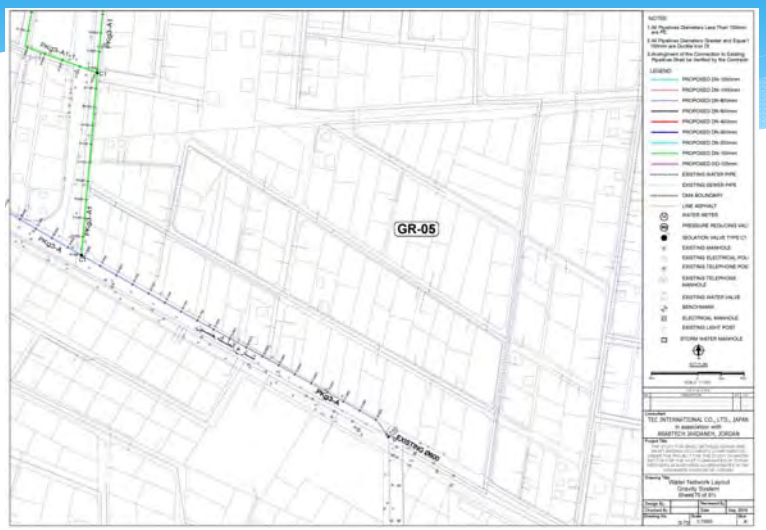
* Key Map
* Pipeline Plan
* Pipeline Profile

14

Key Map

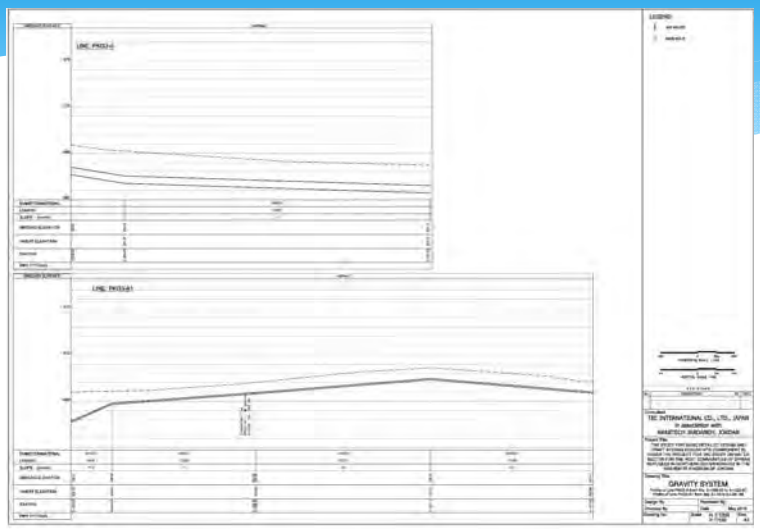


Pipeline Plan



16

Pipeline Profile



17

3. Biding procedure, Conditions of Contract and Specifications

The following statements or questions are made for confirmation purpose to prepare the bidding document.

1. For Bidding Procedure and Conditions of Contract sections, AfD format shall be used.

2. The AfD Bidding document is "Procurement of Works with Significant Environmental and Social Impacts". However, normally this is not required for Water supply projects in Jordan. So the format should still be retained or modified.
   - There is a Cost Schedule also prescribed to be added.

3. Whether the Bidding will be done "with Prequalification" or "without prequalification". We suppose it would be "**without prequalification**"

18

4. Bid Data Sheet (BDS): Do we need to fill up or leave blank?

5. Bidder's Qualification Criteria

5.1. Financial

- Cash Flow requirement ?? **Proposed USD 3.5 Million**
- Average Annual Construction Turnover?? **Proposed USD 7 Million**

5.2 Work Experience

- General Construction Experience?? **Proposed 5 years**
- Specific Experience: **Proposed- 2 contracts each of USD 2 million within last 10 years**

5.3 Personnel

- Project Manager: **B.Tech (Civil), Overall exp 15 years, water supply 10 years, English fluent.**
- ESHS Manager: Degree?? **Total 10 years, Similar 5 years**

6. Preference to domestic Bidders: To be given or not? **Proposed NO.**

7. Alternative Completion Time: To be Considered or not? **Proposed NO.**

8. Whether "Schedule of Particulars"- specifying Manufacturer/Make and Source to be quoted in Bid or not. **Proposed YES.**

19

9. Whether Contract Price shall be adjustable or Fixed Price Contract

10. Whether the rates and prices shall be inclusive of taxes or exclusive?

11. Contract Data to be filled up. The major items are:

- Time of Completion ?? **Proposed 2 years**
- Engineer's Duties and Authority: Any limitations?
- Performance Security ?? **Proposed 5%**
- Delay damages rate?? **Proposed 0.1% per day**
- Maximum delay damages ?? **Proposed 10%**
- Advance payment?? **Proposed 10%**
- Repayment amortization rate ?? **Proposed 20%**
- Retention money ?? **Proposed 10%**
- Limit of retention (incl. performance security) ?? **15%**
- Arbitration law of country and place?? **ICC, Paris**

12. Whether direct payment to sub-contractor shall be allowed or not? **Not.**

13. Number of Contract Packages. **Four or shall be changed.**

20

4. Appurtenances

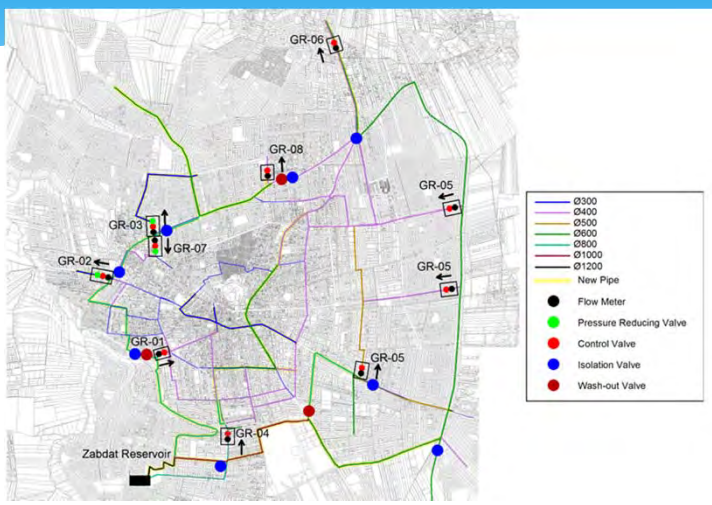
4.1 Location

4.2 Pipe material

4.3 Connection to Zabdat Reservoir

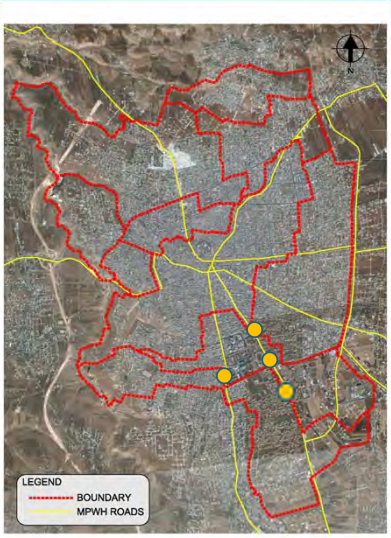
21

4.1 Location



22

Possible Locations for trenchless



23

4.2 Pipe Material

- Ductile Iron (DI) pipe of grade K-9, internally cement mortar lined and externally bitumen and metallic zinc coated, are recommended for the primary pipelines with diameters of 150mm and above.
- For the distribution networks with pipe diameters less than 150 mm, it is recommended that HDPE pipes of 16 bar pressure class be used.

24

4.3 Connection to Zabdat Reservoir

* Under investigating

25

Thank You

26

Minutes of Meeting held between the Study Team for BD/DD (Component B) and PMU of WAJ (including YWC) on 17th January 2017 from 10:00 -12:30 at PMU Office, WAJ

This meeting was convened to present and discuss on the comments from PMU (WAJ), YWC, AFD and KFD on the draft final report submitted by the JICA Study Team towards the end of November 2016. The list of the participants of the meeting is given in Annex 1.

At the outset, Mr. Salameh of PMU welcomed all the participants and started with the comments from WAJ side. The discussion and conclusion followed on all major items are presented in Table as under.

S.N.	Comments and Proposal	Response of JICA Study team and Conclusion
1	WAJ proposed to explain clearly in the bid document about the Bid evaluation procedure of the single-stage three envelope bidding system envisaged in this project.	The study team agreed to incorporate necessary explanations under relevant clauses of Instruction to Bidders or Bid Data Sheet sections as appropriate.
2	WAJ proposed to provide the pipe trench section details in compliance to the requirement of Irbid municipality, especially on a concrete slab cover above the pipeline.	The study team agreed to review the drawings once again ensuring the compliance. In this regard, the YWC agreed to provide sample standard drawings in CAD format.
3	WAJ stated to provide the specifications for pipeline flushing, disinfection and bacteriological test.	The study team replied that such provisions are already made in the specification. However, the same will be reviewed once again and elaborated if necessary.
4	Citing as the proposal from KFW, WAJ requested to include the tertiary pipes under the scope of works.	The Study team replied that it is not possible to go beyond ToR of our study at this juncture. The matter was understood by WAJ and the request dropped.
5	WAJ stated that there are some 100 mm pipes also seen proposed under package 3 whereas pipes below 150 mm is not envisaged to cover under this project.	The study team replied that it will check on the same and if it is the case, such pipes will be removed from the scope of works and document corrected.
6	YWC stated that there are certain pipes newly laid in the Irbid city, which are not seen considered as the existing pipes in this project. As a result some proposed pipes are likely to be duplicated and unnecessary.	The Study team replied that the hydraulic network design is done based on the pipeline data provided by the WAJ/YWC in the past. The YWC could have updated the study team on the newly laid pipes when the basic design was finalized. It is difficult to make major changes at this

S.N.	Comments and Proposal	Response of JICA Study team and Conclusion
		stage which requires major modifications in the design and documents. However, if YWC provides the details quickly, we shall look into them and try to adjust as much as possible. If something can't be incorporated now, the WAJ/YWC can do the changes during contract execution phases too.
7	YWC stated that there is already a newly laid 200 mm pipeline in a stretch of pumping line (package 3) whereas a new 300 mm pipeline is also proposed now for the same section.	The study team replied that the existing pipeline of 200 mm is of smaller diameter than the requirement of 300 mm therein. This will affect the pipeline hydraulics. So both pipes can remain as the demand in future will also increase. The WAJ agreed for it.
8	YWC stated that there are some existing pipes which are not taken into account in the current design and also the alignment of some of the proposed pipes are felt to be changed. So, a mechanism should be installed in the contract to address this and further issues to be arisen in the future.	After a joint brainstorming on this matter, it was agreed to incorporate the following provisions in the Bid document. - Route alignment of all pipelines shall be freshly surveyed by the contractor and final route alignment shall be approved by the Operator/YWC through Engineer at the time of execution of work. - The contractor shall agree for all changes in the alignment/location of pipelines including necessary survey and drawing preparation works for the new alignments. - Any change in the alignment or location shall be at the same cost of fixed linear meter rate quoted in the contract including for the survey and design costs. No additional payments shall be made to the contractor on account of change in alignment and location of pipelines.
9	YWC enquired if the pipe encasement provisions are made wherever they are close to the Sewer lines etc.	The Study team replied that such provisions are made and stated in the preamble to BoQ. However, this will be reviewed once again including creating of a new BoQ items for the cost of encasing works.
10	YWC enquired if the K-series DI pipes are totally ruled out for using and the same is clearly specified in the specification	The study team confirmed that only C-series pipes shall be used in this project. Specifications are provided accordingly.

S.N.	Comments and Proposal	Response of JICA Study team and Conclusion
11	YWC stated that in some case larger diameter pipes are followed by smaller diameter pipes.	The study team replied that it will check on that once again and rectify if necessary.
12	YWC requested to give a presentation on the results of hydraulic model in case of water rationing scenario and on zoning as per Master Plan once again.	The study team agreed to it and it was mutually decided to do the same on 19th January 2017, 10 AM, at YWC office.
13	WAJ drew attention to the comments given by Er. Reham and asked for addressing the same.	The Study team replied that Er. Reham's comments are mostly related to providing adequate description of work on each BoQ items, costing and some clerical errors in the document, which have been already discussed personally by Er. Fatima with her. The documents shall be modified accordingly.
14	WAJ drew attention to some comments and corrections that are prepared by Er. Salameh and are basically on the Bidding procedures, Conditions of Contract and some clerical errors in the document.	Er. Salameh discussed with Er. Osama of AJ on all such points in the sidelines of the meeting. The document shall be modified/corrected accordingly.
15	WAJ drew attention to the comments given by KFW and AFD.	The comments of KFW and AFD are mainly related to Bidding procedures, Conditions of Contract, BoQ, Costing and on some clerical errors in the documents. A lot of comments are same as pointed out by other officials/agencies as mentioned above. However, the study team agreed to look into them, consider and address as necessary.
16	WAJ drew attention to the recent changes made in the Labour Act/ Guidelines of Jordan and incorporation of the same in the Bid document.	The Study team replied that all such changes and additional conditions shall be incorporated under the Particular Conditions of contract and Bid Data Sheet as appropriate.

It was decided to modify and submit the Final Report (5 CDs and 10 hard copies) by the Study team as above. The meeting came to a close by 12:30 PM extending thanks to all the participants by the chair.

Both sides confirmed on the above along with Annex 1 (enclosed).
Amman, 19th January 2017

Eng. Iyad Dahiyat
PMU Director
Water Authority of Jordan
Jordan

Eng. Kazufumi Momose
Team Leader/ JICA Study Team
TEC International Co., Ltd
Japan

Eng. Salameh Mahasneh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

Eng. Bashar Bataineh
Project Manager/Coordinator
Technical Committee
PMU, Water Authority of Jordan
Jordan

6.11 WAJ's Certification for the Draft Design Documents

Ref.: PMU/17/675 Date: 23/4/2017 التاريخ : الرقم :

Mr. Kazufumi Momose
Leader (Chief Consultant)
JICA Study Team

Subject: <u>Certification of the Draft Design Documents for the part of recommended Phase 1 projects in the Water Supply Master Plan</u>

I appreciate the BD/DD Study that covers 3 gravity supply zones and 1 pump zone in Irbid: the Study for Basic/Detailed Design and Draft bidding Documents(Component B) under the project for the study on water sector for the host communities of Syrian refugees in Northern Governorates in the Hashemite Kingdom of Jordan, in the Water Supply Master Plan.
I, on behalf of Water Authority of Jordan (hereinafter referred to as "WAJ"), have considered and examined, among other things, the Draft Basic Design Documents titled "Basic Design Report, Draft Final Report, October 2016" prepared by the BD/DD Study Team.

The capitalized terms not defined herein have the same meanings as those ascribed in the Minutes of the Meetings executed between JICA and WAJ on 21st December, 2015.

Based upon the foregoing, I, on behalf of WAJ, hereby certify as follows:

1. That the measures shown in the Basic Design Documents which WAJ has properly examined and inspected conform with:
   a) laws,standardsandregulationsdulyestablishedandapplicableinJordan;
   b) laws, standards and regulations generally recognized and accepted in the international community such as ISO; and
   c) structural,quantitative,geologicalandotherdemandspeculiartotheprospected implementation of the part of recommended Phase 1 projects in the Water Supply Master Plan.

2. That, therefore, the measures shown in the Basic Design Documents have safety, durability, usability and other factors critical for the implementation of the prospected implementation of the part of recommended Phase 1 projects in the Water Supply Master Plan.

IN WITNESS WHEREOF, I, the undersigned, have hereunto set my hand and affixed my official seal, this day of November 30, 2016.

Very truly yours,

Secretary General Ministry of water and Irrigation
Programme Management Unit
Eng. Iyad Dahiyat

Ref.: PMU/17/676 Date: 23/4/2017 التاريخ : الرقم :

Mr. Kazufumi Momose
Leader (Chief Consultant)
JICA Study Team

Subject: Certification of the Draft Design Documents for the part of recommended Phase 1 projects in the Water Supply Master Plan

I appreciate the BD/DD Study that covers 3 gravity supply zones and 1 pump zone in Irbid: the Study for Basic/Detailed Design and Draft bidding Documents (Component B) under the project for the study on water sector for the host communities of Syrian refugees in Northern Governorates in the Hashemite Kingdom of Jordan,in the Water Supply Master Plan.
I, on behalf of Water Authority of Jordan (hereinafter referred to as "WAJ"), have considered and examined, among other things, the following the documents (hereinafter referred to as "the Draft Design Documents") prepared by the BD/DD Study Team:

(a) Draft Detailed Design Documents and
(b) Draft Bidding Documents.

The capitalized terms not defined herein have the same meanings as those ascribed in the Minutes of the Meetings executed between JICA and WAJ on 21st December, 2015.

Based upon the foregoing, I, on behalf of WAJ, hereby certify as follows:

1. That the measures shown in the Draft Design Documents which WAJ has properly examined and inspected conform with:
   a) laws,standardsandregulationsdulyestablishedandapplicableinJordan;
   b) laws, standards and regulations generally recognized and accepted in the international community such as ISO;and
   c) Structural,quantitative,geologicalandotherdemandspeculiartotheprospected implementation of the part of recommended Phase 1 projects in the Water Supply MasterPlan.

2. That, therefore, the measures shownin the Draft Design Documents have safety,durability, usability and other factors critical for the implementation of the prospected implementation of the part of recommended Phase 1 projects in the Water Supply Master Plan.

IN WITNESS WHEREOF, I, the undersigned, have hereunto set my hand and affixed my official seal, this day of April 16, 2017.

Very truly yours,

Secretary General Ministry of water and Irrigation
Programme Management Unit
Eng. Iyad Dahiyat