

The Islamic Republic of Pakistan
Housing, Urban Development & Public Health Engineering
Department
Government of the Punjab

Project for Improving the Capacity of WASAs in Punjab Province

Final Report

June 2018

Japan International Cooperation Agency (JICA)

NJS Consultants Co., Ltd.

CTI Engineering International Co., Ltd.

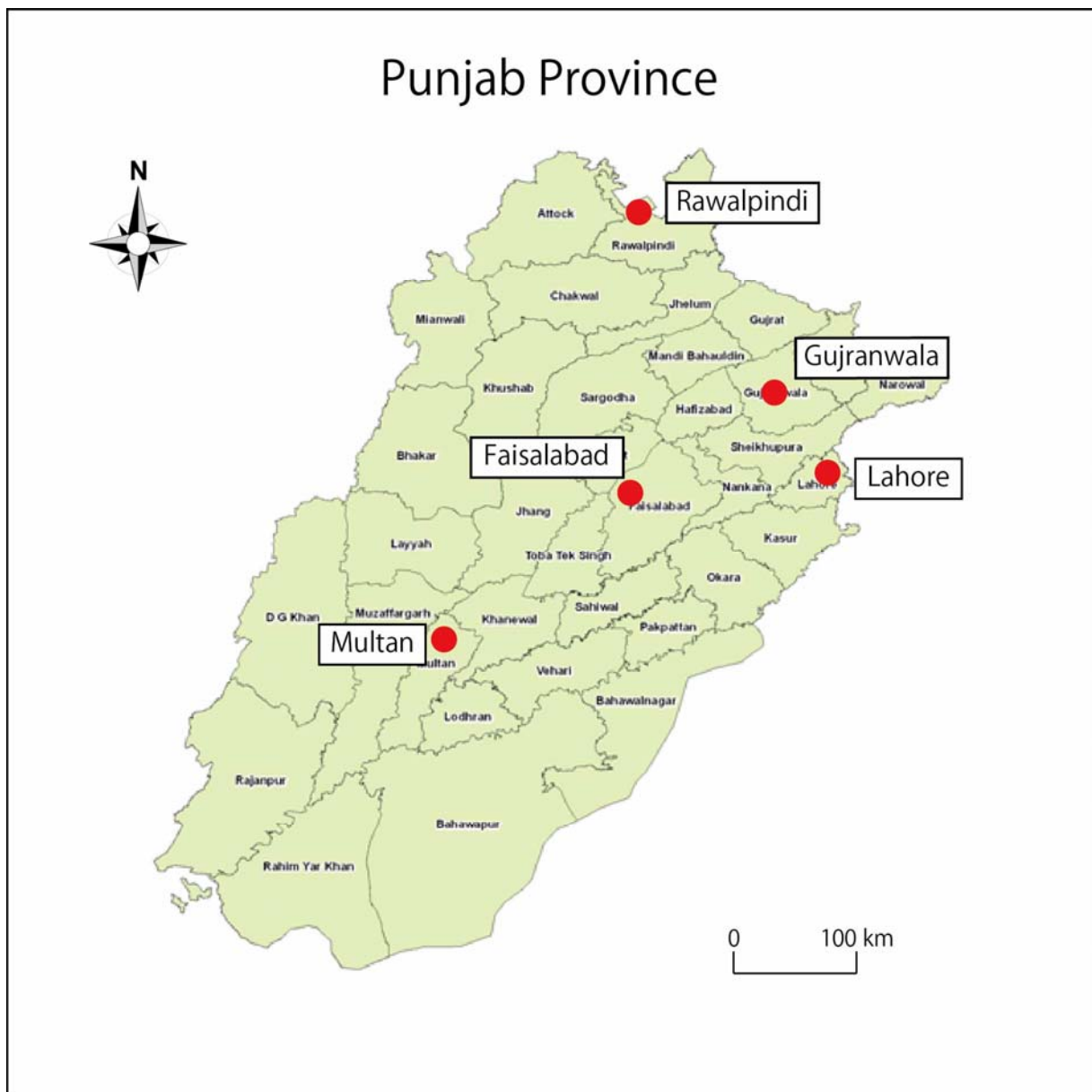
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Location Map of Project Site

Photos

Training Course: O&M of Tube Well and Pump Facility



Photo 1: Exercise for hydraulic analysis



Photo 2: Measurement of water pressure at tube well



Photo 3: Measurement of chlorine residual



Photo 4: Hydraulic model able to observe head loss

Training Course: Leak Detection



Photo 5: Explanation by JICA Expert during lecture



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Photo 27: Support by trainer during exercise



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Abbreviations

| | |
|------------------|---|
| AC | Asbestos Cement |
| AMIS | Asset Management Information System |
| BPS | Basic Pay Scale |
| CA | Capacity Assessment |
| CEO | Chief Executive Officer |
| CH ₄ | Methane |
| CI | Cast Iron |
| CO | Carbon Monoxide |
| CPR | Cardiopulmonary Resuscitation |
| DFR | Draft Final Report |
| EAD | Economic Affairs Division |
| FR | Final Report |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| H ₂ S | Hydrogen Sulfide |
| HSE | Health, Safety & Environment |
| HUD&PHED | Housing, Urban Development & Public Health Engineering Department |
| ICR | Inception Report |
| JCC | Joint Coordinating Committee |
| JET | JICA Expert Team |
| JPO | Junior Pump Operator |
| JS | Japan Sewage Works Agency |
| LG&CDD | Local Government & Community Development Department |
| M/M | Minutes of Meetings |
| MD | Managing Director |
| NRW | Non-Revenue Water |
| O ₂ | Oxygen |
| O&M | Operation and Maintenance |
| OJT | On the Job Training |
| PC | Personal Computer |
| PC-1 | Project Concept -1 |

| | |
|--------|---|
| PCC | Project Coordination Committee |
| PDM | Project Design Matrix |
| PHED | Public Health Engineering Department |
| PKR | Pakistan Rupee |
| PO | Plan of Operation |
| PR | Progress Report |
| R/D | Record of Discussions |
| Rs | Pakistan Rupee |
| SDO | Sub Divisional Officer |
| UPS | Uninterruptible Power Supply |
| UU | Urban Sector Planning & Management Services Unit (the Urban Unit) |
| WASA | Water and Sanitation Agency |
| WATSAN | Water and Sanitation |

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1 Outline of Project

1.1 Background

Five major cities, Lahore, Faisalabad, Multan, Rawalpindi, and Gujranwala, in Punjab Province of Islamic Republic of Pakistan (hereinafter referred to as "Pakistan") have Water & Sanitation Agency (WASA), providing water and sanitation services in the corresponded city. However, WASAs need to improve the operation and maintenance capacity, planning, and assets and financial management. The details are explained as follows:

- i) The tariff of water and sewerage is relatively low. The fix rate is mainly applied. As a result, WASAs are under deficit operation, causing insufficient amount of budget for operation and rehabilitation of the relevant facilities.
- ii) Water is distributed directly from tube wells. Therefore, it is difficult to maintain the constant pressure for the service.
- iii) Water quality is not analyzed regularly.
- iv) Insufficient maintenance causes various issues.
- v) Pipes are old.
- vi) O&M capacity is not sufficient.
- vii) There is no comprehensive system of capacity building, OJT system for WASAs and other service providers in Punjab.

Government of the Punjab acknowledges the above issues, and realizes the need of improving the O&M and management capabilities of WASAs and other service providers (PHED, LG&CDD) for the better water and sewerage services.

Under managed by HUD&PHED, WASA Training Center owned by Lahore WASA was planned to be Punjab WATSAN Academy for training the staff of WASAs in 5 cities. This plan was officially approved in April 2009 by the representatives of Government of the Punjab and 5 WASAs. According to the approval, Government of the Punjab prepared the provincial budget in the fiscal year of 2009/2010 for the expansion and the rehabilitation of the existing facilities. However, the plan was revised to construct a new facility at the other place named as Al-Jazari WATSAN Academy (named after a renowned Muslim Scientist). Following the revised plan, Lahore WASA submitted Project Concept-1 (hereinafter referred to as "PC-1") to the corresponded office in Government of the Punjab and Government of Pakistan. By the budget of the re-approved PC-1 in 2013, the academy was newly constructed at new Location at Township, Lahore. Government of Punjab, HUD&PHED has a vision to train technical and management staff of WASAs in 5 cities and service providers (PHED, LG&CDD)

in Punjab. However, the operational system of the academy had not been established such as the training courses, the implementation of the training, the training of the lecturers, and OJT (On the Job Training) system in the WASAs location. These issues had to be solved by implementing the effective training at the academy.

Facing above issues, Government of Pakistan requested "Project for Improving the Capacity of WASAs in Punjab Province" (hereinafter referred to as "the Project") to Government of Japan. According to the request, JICA dispatched the Detailed Planning Survey Team in 2010, and made the basic agreement for the cooperation. However, the project was postponed until the completion of constructing the building of the academy, which was one of the preconditions for commencing the project. Since foreseeing the completion of the construction in February 2014, JICA dispatched the second Detailed Planning Survey Team in June 2014. After a part of the Minutes of Meetings (hereinafter referred to as "M/M") signed in January 2010 was modified, M/M and Record of Discussions (hereinafter referred to as "R/D") were signed by Japanese and Pakistani sides in March 2015 (see Annex 1.1 and 1.2).

1.2 Outline of Project

- | | |
|------------------------|--|
| 1. Project Title | : Project for Improving the Capacity of WASAs in Punjab Province |
| 2. Overall Goal | : Water supply and sewerage service in 5 WASAs is improved. |
| 3. Project Purpose | : Al-Jazari Academy is functioned as a training institute for capacity development of staff of WASAs and the public water sector. |
| 4. Outputs | : 1) Training system of Al-Jazari Academy is established. 2) The faculties at Al-Jazari Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management. 3) OJT is implemented by trainees of WASAs trained at Al-Jazari Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management. |
| 5. Project Site | : City of Lahore, Rawalpindi, Gujranwala, Faisalabad and Multan |
| 6. Implementing Agency | : 1) HUD&PHED 2) Urban Unit |
| 7. Period of Project | : July 2015 - July 2018 |

The details of overall goal, project purpose, output in Project Design Matrix (hereinafter referred to as "PDM") and Plan of Operation (hereinafter referred to as "PO") are presented in Annex 1.3 and 1.4, respectively.

1.3 Progress of Project

The activity in the first project year (July 2015 - July 2016) was mainly i) training material preparation, ii) curriculum development, iii) capacity development for training implementation, and iv) preparation work for commencement of trainings. In the second project year (August 2016 - June 2017), the trainings were implemented twice for each course except Asset Management and Business Plan. These two courses were scheduled and implemented only once due to the characteristic of the course contents.

Following to the second year, the trainings in the third project year (August 2017 - June 2018) were implemented twice for all courses.

1.4 Organization of Al-Jazari Academy

The organization chart of Al-Jazari Academy is presented in Fig. 1.1. The faculty members of the academy are listed in Annex 1.5.

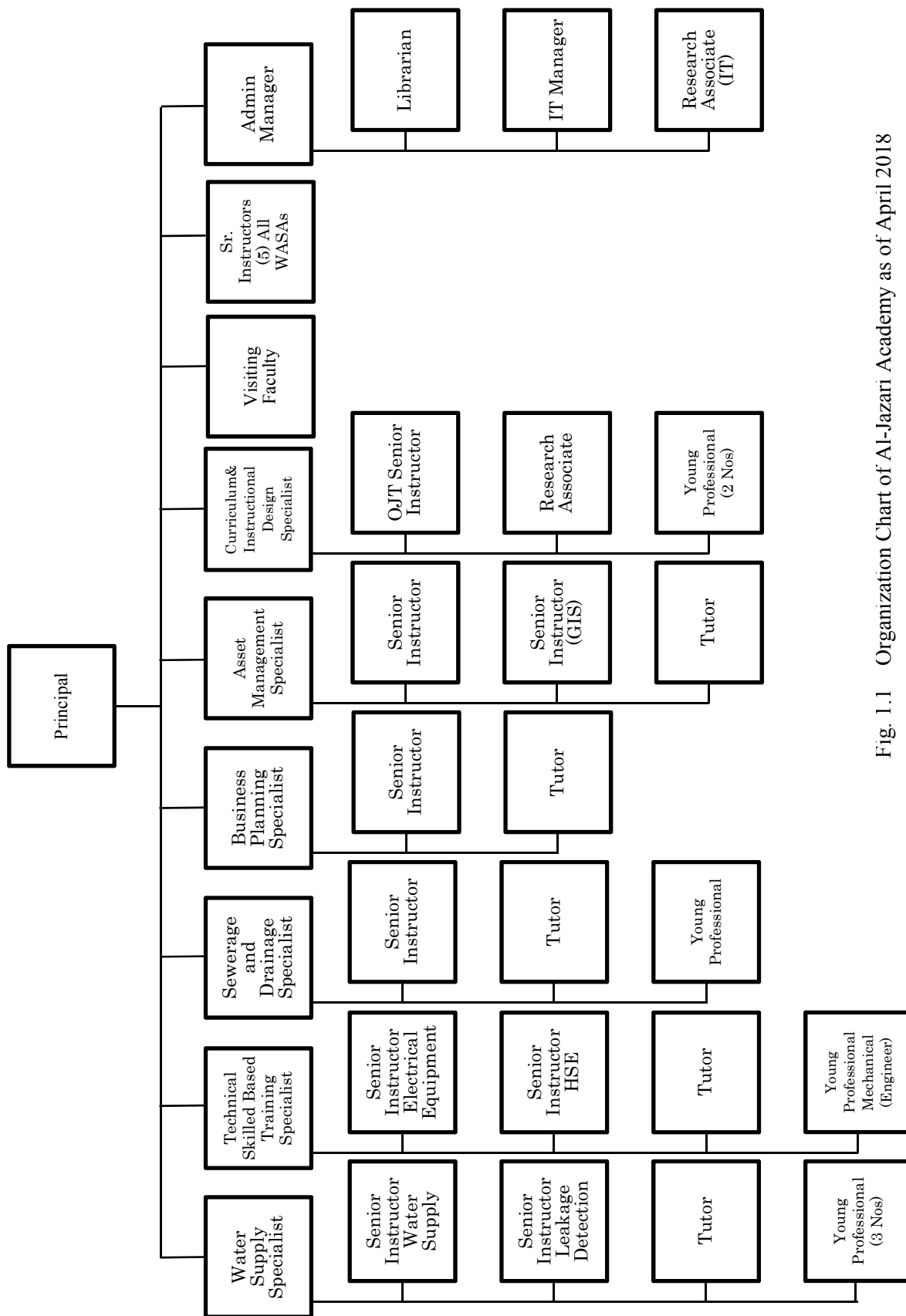


Fig. 1.1 Organization Chart of Al-Jazari Academy as of April 2018

2 Activities in First Project Year (July 2015 - June 2016)

2.1 Work Flowchart

The work flowchart is presented in Annex 2.1. The detail activity plan described for JICA experts and counterparts in charge of each work activity is attached in Annex 2.2.

2.2 Progress for General Activity

[General]

[A-1] Preparation and discussion for Inception Report

Inception Report (hereinafter referred to as "ICR"), consisting of the basic strategy, the methodology of project implementation, and the implementation plan, was prepared through a review on the Detailed Planning Survey of the project and available information and data in Japan. The contents of ICR were discussed and approved by Joint Coordinating Committee (hereinafter referred to as "JCC") on September 22, 2015. Annex 8.1 presents the minutes of meeting on JCC.

[A-2] Preparation of technical specification for equipment to be procured

Table 2.1 presents the procured and procuring equipment. JICA Expert Team (hereinafter referred to as "JET") supported the procurement process as required. The ownership of the equipment was transferred to the Academy (see Annex 2.3).

Table 2.1 Procurement of Equipment as of June 2016

| No | Equipment | Unit | | | |
|-----|---|-----------------|-------------------|-------------------|-------------------|
| | | Procured by JET | Procured by JICA | Procuring by JICA | Total |
| 1 | Equipment for common use in Al-Jazari Academy | | | | |
| | a) Laptop for faculty staff | - | 16 | - | 16 |
| | b) Projector and screen for lecture | - | 5 | - | 5 |
| | c) UPS | - | necessary numbers | - | necessary numbers |
| 2 | Equipment for training | | | | |
| 2-1 | Equipment for water supply, tube well, and pump facility | | | | |
| | Portable ultrasonic-flow meter | 2 | - | 5 | 7 |
| | Pressure gauge | 2 | - | 5 | 7 |
| 2-2 | Equipment for leak detection | | | | |
| | Metal locator | 2 | - | 6 | 8 |
| | Non-metallic pipe locator | 2 | - | 6 | 8 |
| | Acoustic leak detector | 2 | - | 6 | 8 |
| | Acoustic bar | 2 | - | 6 | 8 |
| | Metal pipe locator | 2 | - | 6 | 8 |
| | distance meter | 8 | - | - | 8 |
| | Pressure recorder | 1 | - | 5 | 6 |
| 2-3 | Equipment for safety precaution | | | | |
| | Multi gas (CO, H ₂ S, CH ₄ , O ₂) meter | 2 | - | 10 | 12 |
| 2-4 | Equipment for coordinators | | | | |
| | Laptop PC | 6 | - | - | 6 |
| | Desktop PC | 1 | - | - | 1 |

Note: "2-4 Equipment for coordinators" is newly added. The items and the units except "2-4" are the same as R/D.

[A-3] Assistance for training program in Japan

The training program for "Strengthening for Water Works Agency" was held in Japan from April 11 to 15, 2016 under assistance of JET. The envisaged outcomes of the training were i) to obtain knowledge on role of water works agency, ii) to obtain knowledge on human development plan, and iii) to obtain knowledge on stable water supply technique. The list of the trainees for the program is attached in Annex 2.4.

[A-4] Assistance for inviting lecturer

The academy staff participated workshops such as 3rd Pakistan Urban Forum on December 4-8, 2015 organized by the Urban Unit, and Non-Revenue Water (hereinafter referred to as "NRW") reduction Program for Faisalabad WASA on April 27-29, 2016 organized by Water and Sanitation Program, World Bank. These were great opportunities to listen to the experiences of foreign experts from different nations.

[A-5] Progress monitoring

Project monitoring sheet Ver. 1 and Ver. 2 describe the activities from August 2015 to February 2016, and from March to June 2016, respectively. These sheets were submitted to JICA.

[A-6] Preparation of Progress Report (PR1)

JCC on May 16, 2016 approved PR1, which consists of the progress of the project activities and the schedule of the second project year activity.

[Activities in Output 1]

[A-7] Review on project activities, and operation and management plan including budget, facility, personnel, and organization structure, and provision of recommendation

The master plan was reviewed and agreed according to R/D attached to Annex 1.2. For the management of the academy, the Urban Unit has full responsibility through the lease agreement with Lahore WASA, which owns Al-Jazari Academy. Regarding the budget of operating the academy, the revised PC-1 in October 2014 is available with an amount of 206.458 million Rs in the local component. In addition to PC-1, the Urban Unit purchased some furniture and has supplemented a salary of the staff from its own sources. Regarding the organization system, JICA Expert Team proposed the organization structure of Al-Jazari Academy including additional staff. Then, this proposal was revised by the academy. Annex 2.5 presents the proposal, revised, and the employment status of the staff in the first project year. All members of the academy staff as per organization structure were not employed even though the Urban Unit kept on advertising the post.

[A-8] Investigation of training needs and planning of the detail activities through CA of WASA

In order to obtain basic information from WASAs, the questionnaires were provided to each WASA in August 2015. In addition, the site visits to 5 WASAs were made in order to observe the actual operational conditions and to assess technical understanding of WASA staff. The answer of the questionnaires are attached to Annex 2.6.

The WASAs' training needs were surveyed to prioritize the training items in the field of i) tube well and pump facilities, ii) sewer and storm water drainage, and iii) electrical and mechanical equipment for disposal station, and sewerage and drainage. These training items were selected through a discussion among the academy staff, WASAs, and JET. For the training on the leak detection, the purpose is the reduction of leakage. Many types of methodologies are available for achieving the purpose. However, the approaches were limited due to the local conditions such as the service hours of water distribution and available leak detection equipment. The course contents were developed with consideration of the local conditions. For asset management and business planning, the result of the questionnaire survey together with the interview survey was applied for assessing the needs. Annex 2.7 describes the summary of answer to the questions in questionnaires, which is attached to Annex 2.6, and the assessment of the training needs.

[A-9] Development of curriculum for the Al-Jazari Academy

(1) Preparation of curriculum, and material for the training at Al-Jazari Academy

At first, the definition of the terminologies agreed between Pakistani and JET is described as follows:

1) Curriculum

Curriculum is defined as the outline of training activities, which includes name of courses, modules, and topics, time period of courses, training methodologies, and evaluation of trainees. Framework of training is considered to be the same as curriculum. This project has not used the terminology of "Framework" for avoiding the confusion.

2) Training course

Training course is defined as a group of the same technical field. In this project, the academy establishes 6 courses. Training course includes a part of curriculum.

3) Training material

Training material is defined as lecture notes, slides for lecture, and the others, which are used for the training.

4) Training system

Training system is defined as the necessary procedure of offering the training such as notice to WASA, budget management, logistic, training evaluation, etc.

5) Annual plan

Annual plan is defined as the annual training calendar.

Based on [A-8], the details of lecture topics were discussed and selected between Pakistani and Japanese side in consideration of prioritization by WASAs, an importance of the current services, applicability to 5 WASAs and the others. The curriculum and prepared training materials are attached in Annex 2.8 and 2.9, respectively. The course and module are described in Table 2.2.

Table 2.2 Course and Module

| Course | Module |
|--|--|
| O&M of Tube Well and Pump Facility | 1. O&M of Water Distribution System |
| Leakage Detection | 1. Basic knowledge of Leakage Prevention Work |
| | 2. Leakage detection and repair at the site (OJT) |
| | 3. Installation & operation of the equipment at the site (OJT) |
| O&M of Sewer and Storm Water Drainage | 1. Safety control and measure for sewerage and drainage |
| | 2. Operation and maintenance of sewer system |
| | 3. Operation and maintenance of drainage system |
| O&M of Electrical and Mechanical Equipment | 1. Centrifugal Pumps, Induction Motors and Valves |
| | 2. Electrical Panel and Instrumentation Equipment |
| | 3. Generators |
| | 4. Chlorination and Filtration System |
| | 5. Heavy Machines |
| | 6. Supervisory Control and Data Acquisition (SCADA) |
| | 7. Water Meter Maintenance and Repair |
| Asset Management | 1. Introduction to Asset Management |
| | 2. Creating & Updating Asset Database in Asset Management Information System |
| | 3. Asset Database Analysis |
| | 4. Asset Replacement Plan |
| | 5. Asset Conditions Survey & Analysis |
| | 6. Use of GIS application in Asset Management |
| Business Planning | 1. Business Plan & Operation of WASAs |
| | 2. Strategies for Water and Sanitation Service Delivery Improvement |
| | 3. Human Capital Development |
| | 4. Financial Management System |
| | 5. Implementation of Business Plan |

(2) Formulation of annual plan

The annual plan was prepared for a period of August 2016 - March 2017. The annual plan as of June 2016 for the course base is shown in Fig. 2.1.

| Course | Activity | 2016 | | | | | 2017 | | |
|---|----------------|--------|-----------|---------------------|---------------------|----------|---------------------|---------------------|-------|
| | | August | September | October | November | December | January | February | March |
| O&M of Tube Wells and Pumping facility | Preparation | | ■ | | ■ | | | | |
| | Implementation | | | ■ | ■ | | | | |
| | Evaluation | | | ■ | | ■ | | | |
| Leak Detection | Preparation | | | ■ ■ | ■ | | | | |
| | Implementation | | | ■ | | ■ | | | |
| | Evaluation | | | | ■ | ■ | | | |
| O&M of Sewer and Storm Water Drainage | Preparation | | | ■ ■ ■ | | | ■ ■ ■ | | |
| | Implementation | | | ■ ■ ■ | | | ■ ■ ■ | | |
| | Evaluation | | | | ■ | | | ■ ■ ■ | |
| O&M of Electrical & Mechanical equipment | Preparation | | | ■ ■ ■ ■ ■ | ■ ■ ■ ■ ■ | ■ | ■ ■ ■ ■ ■ | | |
| | Implementation | | | ■ | ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ | | ■ ■ ■ ■ ■ ■ ■ | | |
| | Evaluation | | | | ■ ■ ■ ■ ■ | ■ ■ ■ | | ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ | |
| Asset Management for Water Supply and Sewerage System | Preparation | | | ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ | | | | | |
| | Implementation | | | | ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ | | | | |
| | Evaluation | | | | | | | | |
| Business Planning | Preparation | | | | | | ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ | | |
| | Implementation | | | | | | | ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ | |
| | Evaluation | | | | | | | | |

Fig. 2.1 Annual Plan as of June 2016

[A-10] Provision of training on training methodologies and pedagogical skill to lecturers

The training on training methods and pedagogical skill to lecturers was held according to Table 2.3 and 2.4.

Table 2.3 Training Contents on Training Methodologies and Pedagogical Skill

| Date | Training Contents |
|----------------------------|--|
| Basic Level | |
| Trainer: Naoki Matsuo | |
| Dec 16, 2015 10am - 1pm | <ul style="list-style-type: none"> ◇Try to the exercise and confirm your capacity by yourself ◇Purpose: How to make the article and presentation slide in consideration of the trainees and participants ◆Experience of Ice Breaker ◆Agreeing to the Ground Rule ◇Facilitation and Lecture ◆What is Good Visual Aids? Make and Discuss about good visual aids |
| Dec 17, 2015 10am - 1pm | <ul style="list-style-type: none"> ◆Try to use a feedback sheet ◆Attention for making a presentation slide ◆Attention at the presentation (Let's practice in each group) |
| Dec 18, 2015 10am - 1pm | <ul style="list-style-type: none"> ◆Importance of Closing Session (Consider how to memorize) ◆Necessary Practice for Training Instructor (Let's roleplay with camera) ◇Try to the exercise and confirm your capacity by yourself again |
| Advance level | |
| Trainer: Ken Yokoyama | |
| Apr 6, 2016 10am - 1pm | <ul style="list-style-type: none"> ◆Presentation Structure, Rules on the slide ◆Presentation expression such as font, size, color, number of character per line ◆Denote by mathematic, bullets, margin ◇Picture size, Image editor ◆Graph dressing and editing ◆Shape drawing, toolbar arrangement, application of short cut key ◇Exercise for drawing line on boundary of Japan, and preparing national flag of Pakistan ◇Exercise for preparing drawing by freeform, and national flag of Pakistan ◆Rule for presentation and slide ◆Cue cards and slide number for avoiding misreading ◆Preparation of handouts and lecture slide ◆Background color, number of printing paper, biography of lecturer, avoidance of sleepiness |
| Apr 7, 2016 10am - 1pm | <ul style="list-style-type: none"> ◆Review of lecture in previous day ◇Exercise for preparing slides from textbook ◇Exercise for lecturing by lecture slides ◆Preparation before lecture (lecture room, white board, pens) ◆Evaluation for lecturers (application of checklists ver. 3) |
| Apr 8, 2016 10am - 1pm | <ul style="list-style-type: none"> ◆Review of lecture in previous day ◆Difference of classroom lecture and fieldwork ◆Role of lecturer, preparation, and particular consideration for fieldwork ◆Fieldwork plan for each training course ◇Exercise for preparing fieldwork plan ◇Exercise for preparing checklist of fieldwork ◇Presentation of fieldwork plan and checklist ◆Evaluation for trainers (application of lecture checklist ver. 3) ◆Evaluation for trainees ◆Closure |

Note: ◆ Lecture ◇Exercise

Table 2.4 Participants for Training on Training Methodologies and Pedagogical Skill

| Organization | Dec 2015 | April 2016 |
|---------------------|----------|------------|
| Al-Jazari Academy | 4 | 11 |
| Urban Unit | 3 | 9 |
| Coordinators of JET | 6 | 4 |
| Total | 13 | 24 |

The training was implemented with lecture, interactive practical training, presentation by trainees, evaluation between trainees, feedback activity, and the others. The trainings were evaluated by the trainees based on 9 and 27 items for the basic (see Table 2.5) and the advance (see Table 2.6) level, respectively. The evaluation was made by "Disagreed at all or Bad" to "Much agreed or Excellent". The overall evaluation was more or less between "Agreed" and "Much agreed", or "Good" and "Excellent". The training materials are attached Annex 2.10 for the basic (training in December 2015), and Annex 2.11 for the advance (training in April 2016) level.

Table 2.5 Evaluation for Training on Training Methodologies and Pedagogical Skill in December 2015

(Unit: Person)

| Evaluation for each section | Much agreed | Agreed | Disagreed | Disagreed at all |
|--|-------------|--------|-----------|------------------|
| 1. Ice Breaker | 11 | 2 | 0 | 0 |
| 2. Agreeing to the Ground Rule | 10 | 2 | 0 | 0 |
| 3. Facilitation | 8 | 3 | 1 | 0 |
| 4. What is Good Visual Aids? | 11 | 2 | 0 | 0 |
| 5. Try to use a feedback sheet | 10 | 3 | 0 | 0 |
| 6. Attention for making a presentation slide | 11 | 2 | 0 | 0 |
| 7. Attention at the presentation | 10 | 3 | 0 | 0 |
| 8. Closing Session | 10 | 1 | 1 | 0 |
| 9. Necessary Practice for Training Instructor (Let's roleplay with camera) | 11 | 1 | 0 | 0 |

Table 2.6 Evaluation for Training on Training Methodologies and Pedagogical Skill in April 2016

(Unit: Person)

| Check Item | | Excellent | Good | Fair | Bad |
|---|-------------------|-----------|------|------|-----|
| Lecturer | Teaching skill | 6 | 4 | 2 | |
| | Plain explanation | 7 | 4 | | 1 |
| | Teaching behavior | 8 | 3 | 1 | |
| | English level | 1 | 6 | 3 | 2 |
| Lecture material | Intelligible | 6 | 4 | 2 | |
| | Difficulty level | 4 | 5 | 3 | |
| Comprehensive evaluation | | 7 | 3 | 2 | |
| Presentation Structure | | 7 | 4 | 1 | |
| Presentation Expression (Text & Table) | | 7 | 3 | 2 | |
| Presentation Expression (Photo & Image) | | 7 | 3 | 2 | |
| Presentation Expression (Chart) | | 7 | 3 | 2 | |
| Presentation Expression (Figure) | | 8 | 2 | 2 | |
| Presentation Rule | | 9 | 2 | | 1 |
| Convert from Textbook to Slide | | 8 | 4 | | |
| Try Lecture | | 8 | 3 | 1 | |
| Fieldwork Structure | | 6 | 4 | 2 | |
| Fieldwork Sample | | 8 | 2 | 2 | |
| Make Fieldwork Plan | | 7 | 3 | 2 | |
| Make Check List of Fieldwork Plan | | 8 | 2 | 2 | |
| How to Evaluate Trainees | | 8 | 4 | | |
| Exercise 1&2 | | 9 | 2 | | 1 |
| Exercise 3&4 | | 10 | 1 | | 1 |
| Exercise 5 | | 8 | 4 | | |
| Exercise 6 | | 7 | 4 | 1 | |
| Exercise 7 | | 6 | 5 | 1 | |
| Exercise 8 | | 9 | 2 | 1 | |
| Comprehensive evaluation | | 9 | 1 | 2 | |

[A-11] Establishment of evaluation / testing methods for training course and staff of Al-Jazari Academy in order to sustain and improve training quality

Trainees, trainers, and JET evaluate i) training course, module, and lecture topic, and ii) lecturers. The draft evaluation sheet was prepared as attached in Annex 2.12. The evaluation sheet was reviewed and revised before the first training course was implemented in October 2016.

[A-12] Preparation of OJT Implementation Procedure

OJT operation sheet was prepared as attached in Annex 2.13. In the second and the third project year, OJT Implementation Procedure was prepared as shown in Table 3.32 and Table 4.21, respectively.

[A-13] Review and improvement on curriculum of Al-Jazari Academy

This activity was implemented in the second project year.

3 Activities in Second Project Year (August 2016 - June 2017)

3.1 Work Flowchart

The work flowchart is presented in Annex 2.1. The detail activity plan described for JICA experts and counterparts in charge of each work activity is attached in Annex 2.2.

3.2 Progress for General Activity

[General]

[B-1] Assistance for equipment procurement

JET supported the necessary arrangements for the custom clearance and the acceptance of the equipment, which was procured by JICA.

[B-2] Assistance for training program in Japan

As the training in Japan, "Operation and Maintenance for Water and Sewerage Facilities / Institutional Improvement for Water Works Agencies" was held from January 15 - 21, 2017. The aim of the training was to obtain knowledge on i) O&M of water works facility through pipe network management and leak detection, ii) O&M of sewerage facility through sewer pipe cleaning, treatment plant, and drain system, iii) business strategies for water works agencies, iv) human resources development, and v) tariff collection management. Annex 3.1 presents a list of the trainees.

[B-3] Assistance for inviting lecturer

JET was not requested for necessary assistance regarding an invitation of lecturers from outside of Pakistan.

[B-4] Progress monitoring

Project monitoring sheet Ver. 3 describes the activities from August 2016 to January 2017. The sheet was submitted to JICA.

[B-5] Preparation of Progress Report 2 (PR2)

JCC on May 3, 2017 approved PR2, which consists of the progress of the project activities and the schedule of the third project year activity.

[Activities in Output 1]

[B-6] Review and improvement on curriculum and training system of Al-Jazari Academy

(1) Concept of training fee at Japan Sewage Works Agency

Japan Sewage Works Agency (hereinafter referred to as "JS") has the training center. The concept of the subsidy for the training and training fee, etc. at JS was introduced to Principal of Al-Jazari Academy based on Annex 3.2.

(2) Training cost

The training cost in the training of Fall 2016 was calculated as indicated in Table 3.1.

Table 3.1 Training Cost for Each Course in Fall 2016
- Number of Participant: 20 -

| Course | Duration (Days) | Cost (Rs/Person) |
|---|-----------------|------------------|
| O&M of Tube Well and Pump Facility | 5 | 27,300 |
| Leak Detection | 4 | 19,100 |
| O&M of Sewer and Storm Water Drainage | 9 | 31,100 |
| O&M of Electrical Equipment / O&M of Mechanical Equipment | 21 | 41,000 |
| Asset Management | 15 | 30,900 |
| Business Plan | 18 | 25,900 |

This cost includes i) printing of training materials, ii) transportation for site visit, iii) meals, iv) electricity, v) diesel for generator, vi) salary for facilities, and vii) other necessary cost.

(3) Number of potential trainees

The number of potential trainees at each WASA is as presented in Table 3.2.

Table 3.2 Number of Potential Trainees at WASAs

| WASA | Number of potential trainees* |
|------------|-------------------------------|
| Lahore | 118 |
| Faisalabad | 91 |
| Gujranwala | n/a** |
| Multan | 31 |
| Rawalpindi | 20 |

Note

*: Potential trainees are i) BPS11-18, ii) 55 years old or younger, and iii) relevant designation to courses.

Data are from the database of respective WASA

**: not available

(4) Strengthening of capacity for training coordination

The activities of the training coordination are i) nomination procedure, ii) attendance sheet, and iii) training room preparation with name plate and card. The nomination procedure is i) to issue nomination letter, and ii) to prepare list of participant and circulate the list at the academy. The letter is attached in Annex 3.3. The trainees are required to sign to the list of participants / attendance sheet in the morning and afternoon. The signed sheet is attached in Annex 3.4. The name plate and card are presented in Annex 3.5.

(5) Training to acquire teaching and pedagogical skills to Al-Jazari Academy staff

In August and September 2016, a training on teaching and pedagogical skills was held. This training was targeted on an improvement of the field activities, and led by Mr. Ken Yokoyama, a specialist for Training skill/Curriculum development and assessment. The detail activities are presented in Table 3.3 and 3.4. The main trainees were i) Engr. Muhammad Irfan, a trainer for O&M of Sewer and Storm Water Drainage, and ii) Engr. Zia Mustafa, a trainer for O&M of Tube Well and Pump Facility. On

the second day in Table 3.3 and 3.4, Mr. Yokoyama explained how to implement field works (see Annex 3.6) to the academy staff including Engr. Zia Mustafa and Engr. Muhammad Irfan. At the final date, Engr. Muhammad Irfan (as a trainer) and Engr. Zia Mustafa (as a trainer) led the field work to the academy staff (as trainees) based on the documents prepared through this activity (see Annex 3.7 and 3.8).

Table 3.3 Training on Teaching and Pedagogical Skills
for O&M of Sewer and Storm Water Drainage

| Date | Activities |
|--------------|---|
| Aug 25, 2016 | Discussion / Selection of activity theme as "Maintenance of Sewerage Manhole (Measurement by Gas Meter)" |
| Aug 26, 2016 | Preparation of materials for field training and seminar / Confirmation of equipment and machines / Confirmation at Fieldwork site |
| Aug 29, 2016 | Demonstration at site and in room / Printing out of handout material |
| Aug 30, 2016 | Seminar for field training / Review of seminar |

Table 3.4 Training on Teaching and Pedagogical Skills
for O&M of Tube Well and Pump Facility

| Date | Activities |
|--------------|---|
| Aug 30, 2016 | Discussion / Selection of activity theme as "Survey of Water Pressure in Pipe Network" |
| Aug 31, 2016 | Preparation of materials for field training and seminar / Confirmation of equipment and machines |
| Sep 1, 2016 | Coordination with WASA for improvement of sampling pipe faucet / Confirmation at Fieldwork site |
| Sep 6, 2016 | Confirmation of equipment and machines / Confirmation of sampling pipe faucet improvement / Demonstration at site |
| Sep 7, 2016 | Demonstration in room / Printing out of handout material |
| Sep 8, 2016 | Seminar for field training / Review of seminar |

Mr. Ken Yokoyama gave the evaluation comments to these lecturers regarding above activities (see Annex 3.9). In addition, he observed the actual training to WASA staff and gave the evaluation comments to three trainers (Engr. Muhammad Irfan, Engr. Abid Hussainy, Mr. Nizam-ud-Din) for O&M of Sewer and Storm Water Drainage, and Asset Management. Based on the comments, he explained the improvement items to the trainers. The following comments are an example for one trainer. Annex 3.10 describes all comments.

Course: O&M of Drainage and Sewerage

Date: November 1, 2016

Trainer: Engr. Muhammad Irfan

Comments:

- Good ice-Breaking
- Good eye-contact

- In addition to the lecturer, persons that can speak in lecture are the trainees who are only permitted by the lecturer.
- Keep class discipline
- When a cell phone rings, tell to change silent mode.
- Use a larger size of letters in some slides
- Change a color of letters and background. The color balance is not good.
- PPE video is good. But the important points in video are not indicated in the lecture material. -- Copy video contents to the slides, or paste the copy of the screen-shot to the slide.
- Add short explanation to each icon.
- Not insert letters in the triangle. Insert triangle and textbox separately, then overlap them.
- Give more opportunity for holding/touching/operating equipment to trainees.
- A lecturer explains, and an assistant lecturer supports holding bullhorn and gas meter.
- Another assistant pay attention for outsider to enter the training area.

(6) Public relation

The public relation is very important for awareness of water sector's activity. Table 3.5 presents the issuance of Newsletters from Al-Jazari Academy.

Table 3.5 List of Newsletters until June 2017

| Vol | Date of issue | Reference |
|-----|---------------|------------|
| 1 | May, 2016 | Annex 3.11 |
| 2 | June 2016 | Annex 3.12 |

The activities were introduced by newspapers and TV as indicated in Table 3.6.

Table 3.6 List of Activities Introduced by Media

| Activity | Name of media | web |
|---|------------------------------|---|
| Activity at Multan WASA (O&M of Electrical Equipment, O&M of Mechanical Equipment), 18th February, 2017 | Dunya epaper (newspaper) | http://e.dunya.com.pk/index.php?e_name=MUL&date=2017-02-19&page=109 |
| | Khabrain epaper (newspaper) | http://epaper.dailykhabrain.com.pk/epaper?station_id=9&date=2017-02-19&page_id=24912 |
| Activity at Multan WASA (O&M of Electrical Equipment), 27th March, 2017 | Dunya epaper (newspaper) | http://e.dunya.com.pk/index.php?e_name=MUL&date=2017-03-28&page=2 |
| Activity at Multan WASA (O&M of Sewer and Storm Water Drainage), 22nd March, 2017 | Express news (newspaper) | https://www.express.com.pk/epaper/index.aspx?Issue=NP_MUX&Page=Metropolitan_Page009&Date=20170323&PageNo=9&View=1 |
| | Jang news (newspaper) | http://e.jang.com.pk/03-23-2017/multan/page5.asp |
| | Nawa-e-wakt news (newspaper) | http://www.nawaiwaqt.com.pk/E-Paper/multan/2017-03-23/page-3 |
| | ARYnews (TV) | - |
| Ceremony for leasing equipment to 5WASAs, 16th March, 2017 | City42 (TV) | - |

(7) Revision of training materials and curriculum

The training materials for the training in Fall 2016 were prepared by revising the materials prepared in the first project year. The revisions were made after the training on teaching and pedagogical skills, and discussions between faculties and JICA Experts until the start of the training course. In addition, the training materials for the Spring 2017 were prepared by revising the materials of the Fall 2016. The

revisions were basically considered for upgrading the training. Some revisions were made according to the comments from the trainees. Some were from the findings through the field activities at WASAs. Therefore, the materials were kept on revising.

The training schedule and training materials are attached to Annex as listed in Table 3.7. The training curriculum with evaluation criteria for the Fall 2016 is attached in Annex 3.37. The curriculum for the Spring 2017 was revised as Annex 3.38.

Table 3.7 Training Schedule and Training Materials in Annex

| | Fall 2016 | | Spring 2017 | |
|---------------------------------------|-----------------------------------|--------------------|-------------------------------------|--------------------|
| | Training Schedule | Training Materials | Training Schedule | Training Materials |
| O&M of Tube Well and Pump Facility | Annex 3.13 | Annex 3.19 | Annex 3.25 | Annex 3.31 |
| Leak Detection | Annex 3.14 | Annex 3.20 | Annex 3.26 | Annex 3.32 |
| O&M of Sewer and Storm Water Drainage | Annex 3.15 | Annex 3.21 | Annex 3.27 | Annex 3.33 |
| O&M of Electrical Equipment | Annex 3.16 | Annex 3.22 | Annex 3.28 | Annex 3.34 |
| O&M of Mechanical Equipment | Annex 3.17 | Annex 3.23 | Annex 3.29 | Annex 3.35 |
| Asset Management | Annex 3.18 | Annex 3.24 | <i>not scheduled in Spring 2017</i> | |
| Business Planning | <i>not scheduled in Fall 2016</i> | | Annex 3.30 | Annex 3.36 |

[Activities in Output 2]

[B-7] Provision of training courses for each subject

The annual training plan in the second project year is shown in Table 3.8. The plan for the training in Spring 2017 was prepared after the Fall 2016 was reviewed. The plan was made in consideration of avoiding the overlapping between the courses as much as possible. Asset Management and Business Planning were scheduled only once between October 2016 and April 2017 due to frequency of the application at WASAs and the duration of both training courses.

Table 3.8 Annual Training Implementation from October 2016 to April 2017

| Course | Module | Fall 2016 | Spring 2017 |
|---------------------------------------|---|----------------------------|------------------------------|
| O&M of Tube Well and Pump Facility | O&M of Water Distribution System | Oct 24 - 28 | Mar 20 - 23 |
| Leak Detection | 1. Basic knowledge of Leakage Prevention Work / 2. Leakage detection and repair at the site (OJT) / 3. Install & operation of the equipment at the site (OJT) | Oct 3 - 6 | Feb 20 - 24 |
| O&M of Sewer and Storm Water Drainage | 1. Safety control and measure for sewerage and drainage | Oct 31 - Nov 2 | Feb 13 - 15 |
| | 2. Operation and maintenance of drainage system | Nov 3 - 4 | Feb 16 - 17 |
| | 3. Operation and maintenance of sewer system | Nov 14 - 17 | Mar 7 - 10 |
| O&M of Electrical Equipment | 1. Electrical Panel and Instrumentation Equipment | Nov 23 - 25 | Apr 10 - 14 |
| | 2. Generators | Nov 30 - Dec 2 | |
| | 3. Introduction to Supervisory Control and Data Acquisition (SCADA) & HSE | Dec 7-9 | - |
| O&M of Mechanical Equipment | 1. Centrifugal Pumps, Induction Motors and Valves / 2. Chlorination and Filtration System | Dec 26-30 | Apr 24 - 28 |
| | 3. Water Meter Maintenance and Repair / 4. Heavy Machines | Jan 9-13 | |
| Asset Management | 1. Introduction of Asset Management | Nov 2 - 4 | not scheduled in Spring 2017 |
| | 2. Asset Management Information System (AMIS) | Oct 31 – Nov 1 | |
| | 3. Asset Database Analysis | Nov 21 - 22 | |
| | 4. Asset Replacement Plan | Nov 23 - 24 | |
| | 5. OJT 1: Asset Conditions Survey & Analysis | Dec 5 - 6 | |
| | 6. OJT 2: Introduction of GIS application in Asset Management | Dec 7 - 10 | |
| Business Plan | 1. Business Planning & GAP analysis | not scheduled in Fall 2016 | Feb 6 - 7 |
| | 2. Strategies for Service Delivery Improvements | | Feb 8 - 10 |
| | 3. Strategies for Human Resource Development | | Feb 27 - 28 |
| | 4. Strategies for Financial Management System | | Mar 1 |
| | 5. Business plan formulation and implementation | | Mar 2 - 3 |

The number of participants and the passing rate of the participants are summarized in Table 3.9 and 3.10.

Table 3.9 Number of Participants in Training of Fall 2016

| Name of Course | LHR ^{*1)} | FSD ^{*2)} | MUL ^{*3)} | GUJ ^{*4)} | RWL ^{*5)} | Others | Total | Pass ^{*6)} | Fail ^{*6)} | Pass Rate ^{*6)} |
|---------------------------------------|----------------------------|--------------------|--------------------|--------------------|--------------------|--------|-------|---------------------|---------------------|--------------------------|
| O&M of Tube Well and Pump Facility | 7 | 3 | 3 | 2 | 2 | 2 | 19 | 16 | 3 | 84% |
| Leak Detection | 8 | 2 | 2 | 2 | 2 | 4 | 20 | 16 | 4 | 80% |
| O&M of Sewer and Storm Water Drainage | 8 | 2 | 2 | 2 | 2 | 3 | 19 | 17 | 2 | 89% |
| O&M of Electrical Equipment | 7 | 1 | 2 | 1 | 1 | 3 | 15 | 11 | 4 | 73% |
| O&M of Mechanical Equipment | 7 | 1 | 2 | 1 | 2 | 2 | 15 | 7 | 8 | 47% |
| Asset Management | 9 | 2 | 2 | 2 | 3 | 1 | 19 | 12 | 7 | 63% |
| Business Planning | not scheduled in Fall 2016 | | | | | | | | | |
| Total | 46 | 11 | 13 | 10 | 12 | 15 | 107 | 79 | 28 | 74% |

Note: *1: Lahore WASA, *2: Faisalabad WASA, *3: Multan WASA, *4: Gujranwala WASA

*5: Rawalpindi WASA, *6: refer to "trainee's evaluation" in each course

Table 3.10 Number of Participants in Training of Spring 2017

| Name of Course | LHR ^{*1)} | FSD ^{*2)} | MUL ^{*3)} | GUJ ^{*4)} | RWL ^{*5)} | Others | Total | Pass ^{*6)} | Fail ^{*6)} | Pass Rate ^{*6)} |
|---------------------------------------|------------------------------|--------------------|--------------------|--------------------|--------------------|--------|-------|---------------------|---------------------|--------------------------|
| O&M of Tube Well and Pump Facility | 1 | 0 | 2 | 0 | 2 | 3 | 8 | 6 | 2 | 75% |
| Leak Detection | 0 | 0 | 2 | 1 | 2 | 6 | 11 | 9 | 2 | 82% |
| O&M of Sewer and Storm Water Drainage | 4 | 2 | 2 | 2 | 0 | 7 | 17 | 9 | 8 | 53% |
| O&M of Electrical Equipment | 6 | 0 | 2 | 0 | 1 | 2 | 11 | 11 | 0 | 100% |
| O&M of Mechanical Equipment | 2 | 2 | 2 | 0 | 2 | 4 | 12 | 12 | 0 | 100% |
| Asset Management | not scheduled in Spring 2017 | | | | | | | | | |
| Business Planning | 7 | 2 | 3 | 1 | 2 | 3 | 18 | 11 | 7 | 61% |
| Total | 20 | 6 | 13 | 4 | 9 | 25 | 77 | 58 | 19 | 75% |

Note: *1: Lahore WASA, *2: Faisalabad WASA, *3: Multan WASA, *4: Gujranwala WASA

*5: Rawalpindi WASA, *6: refer to "trainee's evaluation" in each course

The summary of i) course evaluation, ii) trainer's evaluation, iii) trainee's evaluation, and iv) revision to following training is described separately in each course below. The courses and trainers were evaluated by the trainees based on the questionnaires "Form A" (course evaluation), and "Form B" (trainer's evaluation) as attached in Annex 3.39. The trainees' evaluation is based on "Pass/fail" in Table 3.9 and 3.10. The revisions for the following training were discussed between the faculties and JICA experts after reviewing the training including the comments i) from the trainees during courses, and ii) described in "Form A" and "Form B".

i) O&M of Tube Well and Pump Facility

i-a) Course evaluation

Table 3.11 presents the course evaluation from Question No 1 to No 10 in "Form A" (see Annex 3.39). The detail and the rest of answer for the course evaluation "Form A" are presented in Annex 3.40 for the training in Fall 2016 and Annex 3.41 for the Spring 2017. The evaluation result was higher than expected for both trainings. The reason of highly rated result in the Fall 2016 might be that the participants had never attended this category of the training. Among all items, "Time & Length of Training" was the lowest satisfaction. Some reasons were too long, and some were too short. However, in case of the Spring 2017, another reason was considered. The trainee's name was not required to be written for answering "Form A" and "Form B". The reason of changing direction was that the higher evaluation by the trainees might be resulted from writing the name of answerer. However, the actuality was different. Without writing the name, the trainees might not consider the questionnaire seriously.

Table 3.11 Course Evaluation for O&M of Tube Well and Pump Facility
in Fall 2016 and Spring 2017

| Sr. No | How satisfied were you with: | Average* | |
|-----------|--|--------------|----------------|
| | | Fall 2016 | Spring 2017 |
| 1 | Difficulty Level of Training Themes | 3.3 | 3.0 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 3.6 | 3.7 |
| 3 | Relevance of On-Site Training Activities | 3.6 | 3.7 |
| 4 | Overall Presentation Quality of Trainer | 3.6 | - |
| 5 | Trainer's Expertise on Topics and Topic Delivery Skills | 3.7 | 3.7 |
| 6 | Time & Length of Training | 2.9 | 3.7 |
| 7 | Practical Activities & Exercise at Class Room | 3.4 | 3.5 |
| 8 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc.) | 3.3 | 3.2 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.7 | 3.7 |
| 10 | Overall Quality of Training | 3.6 | - |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Not Satisfied", "3" for "Somewhat Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

i-b) Trainer's evaluation

All items of Trainer's evaluation by the trainees were rated between "Very good" and "Excellent" as presented in Table 3.12. Especially the training in Spring 2017 was highly rated. However, JICA Expert identified the following issues to be improved.

- The speaking was too fast.
- Eye contact was less frequent.
- The presentation slides were not appropriately explained.
- When answered, the lecturer was attentive only to the person who asked.

Table 3.12 Trainer's Evaluation for O&M of Tube Well and Pump Facility
in Fall 2016 and Spring 2017

| Sr. No | Items | Average* | |
|-----------|---|-----------|-------------|
| | | Fall 2016 | Spring 2017 |
| 1 | Qualification & Experience | 4.6 | 4.8 |
| 2 | Technical Knowledge of the Content | 4.5 | 4.8 |
| 3 | Explanation of the Content | 4.4 | 4.7 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 4.6 | 4.8 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 4.6 | 4.7 |
| 6 | Management of on-site Training | 4.3 | 4.7 |
| 7 | Time Management | 4.8 | 4.7 |
| 8 | Presentation Skills | 4.8 | 4.8 |
| 9 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 4.4 | 4.2 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

Annex 3.40 and 3.41 present more detail of the Fall 2016 and the Spring 2017, respectively, for the trainer's evaluation, "Form B" (see Annex 3.39).

i-c) Trainees' evaluation

The passing rates in this course for the Fall 2016 and the Spring 2017 were at 84 and 75%, respectively, as presented in Table 3.9 and 3.10. Annex 3.40 and 3.41 for the Fall 2016 and the Spring 2017, respectively, indicate the details such as name of trainee, and the evaluation of attendance and assignment. The fails for the Fall 2016 and the Spring 2017 were 3 and 2 trainees, respectively. The failing reason was mainly that the assignment was not submitted or submitted with insufficient quality.

i-d) Revision to training in Fall 2017

The revision to the training in Spring 2017 from the Fall 2016 was discussed between the faculties of the academy and JICA Experts including the comments from the trainees, listed in Annex 3.40. Table 3.13 is the main components of the revision.

Table 3.13 Major Revision to Training in Spring 2017 from Fall 2016
for O&M of Tube Well and Pump Facility

| No | Subject | Detail |
|----|---|---|
| 1 | Duration | The duration reduces from 5 to 4 days. It was too details in 1st- and 2nd-day classes in training of Fall 2016. These classes were merged to one. |
| 2 | Practical Training starting from more basic level | In order to enhance the understanding of software for hydraulic analysis, EPANET, the trainer will train the trainees from basic level. |
| 3 | Selection of Field Training | Before the training, the water pressure will be measured at several locations in order to select the ideal location of the pressure measurement for hydraulic analysis. |

The revisions to the Fall 2017 from the Spring 2017 were expected that i) the training materials would include more specific pictures and figures for better understanding, and ii) exercise for hydraulic analysis would include various diameters of pipes in order to understand the difference. The detail was discussed in the third project year.

ii) Leakage Detection

ii-a) Course evaluation

Table 3.14 presents the course evaluation from Question No 1 to No 10 in "Form A" (see Annex 3.39). The detail and the rest of answer for the course evaluation, "Form A" are presented in Annex 3.42 for the training in Fall 2016 and Annex 3.43 for the Spring 2017. In the Fall 2016, among the technical items, "Difficulty Level of Assessment and Evaluation" was evaluated as the lowest. It means that the trainees could not perform well for the assignment work. However, the assignment was the necessary basic contents in this course. The logistic arrangement was evaluated equivalent to "Difficulty Level of Assessment and Evaluation". The first course in the Fall 2016 was started from this course. The academy staff might not have arranged it well. In addition, the trainees had to come to the academy by bus due to under construction of the hostel. This might be the reasons for it. In the Spring 2017, the logistic arrangement was evaluated as less than "Somewhat satisfied".

The reason was complaints against i) cold water shower, ii) food, and iii) uncomfortable bed. Among technical items, "Difficulty Level of Training Themes" was evaluated as the lowest. The trainer was newly assigned just before the Spring 2017. Therefore, the trainer had less time of the technical training from JICA Expert as compared to the trainer for the Fall 2016. Due to the reason, the trainees might not have understood the actual meaning of training themes, and marked the lower point.

Table 3.14 Course Evaluation for Leakage Detection in Fall 2016 and Spring 2017

| Sr. No | How satisfied were you with: | Average* | |
|--------|--|-----------|-------------|
| | | Fall 2016 | Spring 2017 |
| 1 | Difficulty Level of Training Themes | 3.3 | 2.4 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 3.5 | 3.2 |
| 3 | Relevance of On-Site Training Activities | 3.4 | 3.1 |
| 4 | Overall Presentation Quality of Trainer | 3.6 | - |
| 5 | Trainer's Expertise on Topics and Topic Delivery Skills | 3.4 | 3.1 |
| 6 | Time & Length of Training | 2.9 | 3.0 |
| 7 | Practical Activities & Exercise at Class Room | 3.3 | 3.0 |
| 8 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc.) | 2.8 | 3.3 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 2.8 | 1.8 |
| 10 | Overall Quality of Training | 3.5 | - |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

ii-b) Trainer's evaluation

All items of Trainer's evaluation by the trainees were rated as more or less "Very Good" for the Fall 2016, and between "Good" and "Very Good" for the Spring 2017 as indicated in Table 3.15. The trainer for the Fall 2016 spent sufficient time for preparing the lecture and the field training in this course. However, the trainer for the Spring 2017 did not do so because he was assigned just before the Spring 2017. Regardless of the replacement, the trainer was required to have more experience of the actual field work.

Table 3.15 Trainer's Evaluation for Leakage Detection in Fall 2016 and Spring 2017

| Sr. No | Items | Average* | |
|--------|---|-----------|-------------|
| | | Fall 2016 | Spring 2017 |
| 1 | Qualification & Experience | 3.8 | 3.7 |
| 2 | Technical Knowledge of the Content | 3.8 | 3.8 |
| 3 | Explanation of the Content | 4.0 | 3.6 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 4.0 | 3.7 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 4.2 | 3.7 |
| 6 | Management of on-site Training | 4.2 | 3.4 |
| 7 | Time Management | 4.0 | 3.7 |
| 8 | Presentation Skills | 4.3 | 3.8 |
| 9 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 4.1 | 3.6 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

Annex 3.42 and 3.43 present more detail of the Fall 2016 and Spring 2017, respectively, for the trainer's evaluation, "Form B" (see Annex 3.39).

ii-c) Trainees' evaluation

The passing rates in this course for the Fall 2016 and the Spring 2017 were at 80 and 82%, respectively, as presented in Table 3.9 and 3.10. Annex 3.42 and 3.43 for the Fall 2016 and the Spring 2017, respectively, indicate the details such as name of trainee, and the evaluation of attendance and assignment. The fails for the the Fall 2016 and the Spring 2017 were 4 and 2 trainees, respectively. The failing reason was mainly by not submitting the assignments and/or low attendance rate.

ii-d) Revision to following training

The revision to the Spring 2017 from the Fall 2016 was discussed between the faculties of the academy and JICA Experts based on the comments from the trainees, listed in Annex 3.42. The revision was mainly to add the new activities shown in Table 3.16.

Table 3.16 Newly Added Activities in Training of Spring 2017 from Fall 2016 for Leakage Detection

| No. | Subject | Duration | Training method/contents |
|-----|--|----------|--|
| 1 | Visit to PLASCO Pipe | 1 day | Visiting a pipe manufacturer of "PLASCO Pipe", and obtain basic information and joint of HDPE through explanation and observation of manufacturing process |
| 2 | Case Study | 2 hr | Analyzing and identifying issues related to NRW in city "A", and discuss countermeasure |
| 3 | Comparison of pipe material | 30 min | Comparing characteristic of different materials for pipes, and discussing a suitable pipe material under specified condition |
| 4 | GPS System Information | 40 min | Obtaining basic knowledge on GPS applied to mapping and asset management |
| 5 | How to connect Ultrasonic Flow meter to PC | 30 min | Obtaining technique to read/save data of ultrasonic flow meter into PC |

The revision to the Fall 2017 was to include two comments in the Fall 2016, which were not included in the revision of the Spring 2017. One was "Repairing & detection of leakages at different spots such as under sewer line, drainage, gas pipeline, etc.". The other was "GIS mapping and marking of repairing site". The other revisions by the comments from the trainees in the Spring 2017 are described in Annex 3.43.

iii) O&M of Sewer and Storm Water Drainage

iii-a) Course evaluation

Table 3.17 presents the course evaluation, a summary of "Form A" (see Annex 3.39) for Module 1&2 and 3, separately evaluated. The detail and the rest of answer for the course evaluation, "Form A" are presented in Annex 3.44 for the training in Fall 2016 and Annex 3.45 for the Spring 2017. Almost all items were rated as "Satisfied" or better. In the Fall 2016, there were comments to "Time & Length of Training" as too short and too long. However, in the Spring 2017, many trainees gave a comment to "Time" as appropriate even though the same time for each module was allocated. The reason of this difference might be simply due to the different participants to the Fall 2016 and the Spring 2017, or might be implied to an improvement of the Spring 2017.

Table 3.17 Course Evaluation for O&M of Sewer and Storm Water Drainage in Fall 2016 and Spring 2017

| Sr. No | How satisfied were you with: | Average* | |
|--------|---|-----------|-------------|
| | | Fall 2016 | Spring 2017 |
| 1 | Difficulty Level of Training Themes | 3.2 - 3.4 | 2.9 - 3.4 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 3.5 - 3.8 | 3.5 - 3.7 |
| 3 | Relevance of On-Site Training Activities | 3.4 - 3.6 | 3.5 - 3.8 |
| 4 | Overall Presentation Quality of Trainer | 3.7 - 3.9 | - |
| 5 | Trainer's Expertise on Topics and Topic Delivery Skills | 3.7 - 3.8 | 3.7 |
| 6 | Time & Length of Training | 2.9 - 3.0 | 3.1 - 3.3 |
| 7 | Practical Activities & Exercise at Class Room | 3.3 - 3.4 | 3.3 - 3.7 |
| 8 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc. | 3.2 - 3.4 | 2.9 - 3.3 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.2 - 3.6 | 3.4 - 3.7 |
| 10 | Overall Quality of Training | 3.7 | - |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

iii-b) Trainer's evaluation

Table 3.18 presents the trainer's evaluation, a summary of "Form B" (see Annex 3.39) for Module 1&2 and 3, separately evaluated. The detail and the rest of answer for the course evaluation, "Form B" are presented in Annex 3.44 for the training in Fall 2016 and Annex 3.45 for the Spring 2017. The result for both trainings was rated between "Very Good" and "Excellent". Mr. Muhammad

Irfan, a trainer of this course, has experience to teach at university. JICA Expert considers that this experience contributed such high rating.

Table 3.18 Trainer's Evaluation for O&M of Sewer and Storm Water Drainage in Fall 2016 and Spring 2017

| Sr. No | Items | Average* | |
|--------|---|-----------|-------------|
| | | Fall 2016 | Spring 2017 |
| 1 | Qualification & Experience | 4.4 - 4.6 | 4.5 |
| 2 | Technical Knowledge of the Content | 4.5 - 4.6 | 4.5 |
| 3 | Explanation of the Content | 4.6 | 4.6 - 4.7 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 4.6 - 4.7 | 4.6 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 4.4 - 4.6 | 4.4 - 4.8 |
| 6 | Management of on-site Training | 4.5 | 4.5 - 4.8 |
| 7 | Time Management | 4.0 - 4.3 | 4.5 - 4.6 |
| 8 | Presentation Skills | 4.6 | 4.8 |
| 9 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 4.4 | 4.4 - 4.6 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

iii-c) Trainees' evaluation

The passing rates in this course for the Fall 2016 and the Spring 2017 were 89 and 53 %, respectively, as presented in Table 3.9 and 3.10. Annex 3.44 and 3.45 indicate the detail of the Fall 2016 and the Spring 2017, respectively, such as name of trainee, and the evaluation of attendance and assignment. The fails for the Fall 2016 and the Spring 2017 were 2 and 8 trainees, respectively. The failing reason was mainly by not submitting the assignments and/or low attendance rate.

iii-d) Revision to following training

The revision to the training in Spring 2017 from the Fall 2016 was discussed between the faculties of the academy and JICA Experts based on the comments from the trainees, listed in Annex 3.44. Table 3.19 is the main components of the revision.

Table 3.19 Major Revision to Training in Spring 2017 from Fall 2016 for O&M of Sewer and Storm Water Drainage

| No. | Subject | Detail |
|-----|--|---|
| | Module: Safety control and measure for sewerage and drainage | |
| 1 | First aid disaster management | Visiting a training center of Rescue1122 is added due to demonstration facilities such as manhole and first aid equipment in order. |
| | Module: Operation and maintenance of drainage system | |
| 2 | Visit of Central Drainage Office at Lahore WASA | Smaller scale of drainage system in Lahore is exhibited. Drainage system is explained in front of the exhibition. |
| 3 | Elimination of visiting Solid Waste Dumping Site | Deleted due to no requirement of sludge treatment for WASA |
| | Module: Operation and maintenance of sewer system | |
| 4 | Training on CCTV (closed-circuit television) | The training on observing inside sewer pipe by CCTV is added because it was confirmed that Lahore WASA has CCTV. |

The revision to the Fall 2017 was considered according to the comments from the trainees in the Spring 2017 such as i) use of more simple words and full words (not abbreviation) for technical terminology and explanation, ii) an increase of more time for the field training, and iii) teaching exercise in detail to one by one, etc.

iv) O&M of Electrical Equipment

iv-a) Course evaluation

Table 3.20 presents the course evaluation, a summary of Question No 1 to 10 in "Form A" (see Annex 3.39) for each module, separately evaluated. The detail and the rest of answer for the course evaluation, "Form A" are presented in Annex 3.46 for the training in Fall 2016 and Annex 3.47 for the Spring 2017. The classes were implemented with exhibition of various tools and equipment in order to obtain the right knowledge and technique effectively and efficiently. The trainers arranged the course for touching these tools and equipment more in the Spring 2017 than the Fall 2016. As a result, "Practical Activities & Exercise at Class Room" was highly rated. Because only a few staff of WASAs studied electrical engineering, many of the trainees were non-electrical engineer such as civil engineer or mechanical engineer. Therefore, in the Spring 2017, the technical explanation was arranged for the understandable level to non-electrical engineers. This arrangement might bring the result of "Quality of Training Material" as higher in the Spring 2017 than the Fall 2016. On the other hand, "Time & Length of Training" was rated as low in the Fall 2016. The reason was dissatisfaction to the training schedule. In detail, each module was scheduled to 3 days. Then three modules were held in 3 weeks. Therefore, the trainees had to travel 3 times between their offices and the academy in this course. It was not preferable especially to the trainees from other than Punjab Province. For reducing the trips, the higher priority modules of i) Electrical Panel and Instrumentation Equipment, and ii) Generators were implemented continuously. As a result, only 1 trip was required, which was 2 trips less than the Fall 2016. For that reason, "Time & Length of Training" was rated as higher in the Spring 2017 than the Fall 2016.

Table 3.20 Course Evaluation for O&M of Electrical Equipment in Fall 2016 and Spring 2017

| Sr. No | How satisfied were you with: | Average* | |
|--------|--|-----------|-------------|
| | | Fall 2016 | Spring 2017 |
| 1 | Difficulty Level of Training Themes | 2.8 - 3.1 | 3.4 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 3.0 - 3.3 | 3.5 |
| 3 | Relevance of On-Site Training Activities | 2.9 - 3.4 | 3.4 |
| 4 | Overall Presentation Quality of Trainer | 3.3 - 3.6 | - |
| 5 | Trainer's Expertise on Topics and Topic Delivery Skills | 3.3 - 3.4 | 3.3 |
| 6 | Time & Length of Training | 2.2 - 2.4 | 2.9 |
| 7 | Practical Activities & Exercise at Class Room | 3.1 - 3.4 | 3.5 |
| 8 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc.) | 3.1 - 3.3 | 3.3 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 2.7 - 3.3 | 3.1 |
| 10 | Overall Quality of Training | 3.0 - 3.3 | - |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

iv-b) Trainer's evaluation

Table 3.21 presents the trainer's evaluation, a summary of "Form B" (see Annex 3.39) for each module, separately evaluated. The detail and the rest of answer for the course evaluation, "Form B" are presented in Annex 3.46 for the training in Fall 2016 and Annex 3.47 for the Spring 2017. Almost all items of Trainer's evaluation by the trainees was rated as "Very Good" or "4" \pm 0.5. Due to the experience in electrical field, the trainer has sufficient technical knowledge on implementing the training. This was considered as the main reason to receive the high rating related to the technical items. On the other hand, "Time Management" in Module 2 for the training in Fall 2016 was rated as the lowest among the trainer's evaluation. The reason was that it was less time to observe and learn on the field due to a visit to 3 locations in a limited time. Considering this reason, the field visit for the training in Spring 2017 was reduced from 3 to 2. As a result, the evaluation of "Time Management" was improved in the Spring 2017.

Table 3.21 Trainer's Evaluation for O&M of Electrical Equipment in Fall 2016 and Spring 2017

| Sr. No | Items | Average* | |
|--------|---|-----------|-------------|
| | | Fall 2016 | Spring 2017 |
| 1 | Qualification & Experience | 3.7 - 4.3 | 3.7 - 4.0 |
| 2 | Technical Knowledge of the Content | 3.8 - 4.5 | 3.9 - 4.1 |
| 3 | Explanation of the Content | 3.8 - 4.5 | 4.2 - 4.3 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 3.9 - 4.3 | 4.2 - 4.4 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 3.7 - 4.2 | 3.9 - 4.0 |
| 6 | Management of on-site Training | 3.6 - 4.3 | 3.9 - 4.1 |
| 7 | Time Management | 3.1 - 4.4 | 4.2 - 4.5 |
| 8 | Presentation Skills | 3.7 - 4.5 | 4.0 - 4.2 |
| 9 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 3.6 - 4.5 | 4.3 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

iv-c) Trainees' evaluation

The passing rates were at 73 % for the training in Fall 2016 and 100% for the Spring 2017 as presented in Table 3.9 and 3.10, respectively. Annex 3.46 and 3.47 for the Fall 2016 and the Spring 2017, respectively, indicate the details such as name of trainee, and the evaluation of attendance and assignment. The fails attended less than a half of this training course. The reason of absence was mainly for the requirement of their daily work. The understanding from their seniors is one of the key issues for an improvement of the attendance rate.

iv-d) Revision to following training

The revision to the training of Spring 2017 from the Fall 2016 was discussed between the faculties of the academy and JICA Experts based on the comments from the trainees, listed in Annex 3.46. Table 3.22 is the main components of the revision.

Table 3.22 Major Revision to Training in Spring 2017 from Fall 2016 for O&M of Electrical Equipment

| No. | Subject | Detail |
|---|---------------------------|--|
| Module: Electrical Panel and Instrumentation Equipment / Generators | | |
| 1 | Duration | Modules for Electrical Panel and Instrumentation Equipment (3 days) and Generators (3days) were separately implemented. By efficient implementation, these two modules are merged and the duration is reduced from 6 days to 5 days. |
| 2 | Quantitative measurement | Using i) Infrared Thermometer, ii) Infrared Digital Tachometer, iii) Single Phase Power Analyzer, v) Battery Hydrometer in order to measure actual data |
| 3 | Exercise / Field training | Implement more variety of exercise and field training |
| 4 | Language | More use of Urdu |
| Module: Introduction to Supervisory Control and Data Acquisition (SCADA) & Health, Safety & Environment (HSE) | | |
| 1 | Revision of 5S activity | 5S will be trained during field training of SCADA and HSE instead of training as an independent class in Cycle 1. |
| 2 | Trainer of HSE | The trainer of HSE will be a faculty of the academy instead of training by RESCUE 1122 in the training of Fall 2016. |
| 3 | Language | More use of Urdu |

The revision to the training in Fall 2017 from the Spring 2017 was discussed between the faculty of the academy and JICA Expert based on the comments from the trainees, listed in Annex 3.47. As a result, the items to be revised were mainly i) to reduce a number of the slides and technical terms for understanding more deeply, ii) to include a training on checking appropriateness of electrical installation by earth resistance tester, and iii) to upgrade more practical for a subject of HSE (Health, Safety & Environment).

v) O&M of Mechanical Equipment

v-a) Course evaluation

Table 3.23 presents the course evaluation, a summary of Question No 1 to 10 in "Form A" (see Annex 3.39). The detail and the rest of answer for the course evaluation, "Form A" are presented in Annex

3.48 for the training in Fall 2016 and Annex 3.49 for the Spring 2017. The classes were implemented with exhibition of various tools and equipment in order to obtain the right knowledge and technique effectively and efficiently. The trainers arranged the course for touching these tools and equipment more in the Spring 2017 than the Fall 2016. This could be the reason that "Trainer's Expertise on Topics and Topic Delivery Skills" was rated as higher in the Spring 2017 than the Fall 2016. JICA Expert evaluated that such practical activities were very effective. However, one of the trainees requested to exhibit the equivalent equipment of pumping station. Partially, it may be possible but not for all due to so many equipment. However, such request could be considered as the highly attractive and effective practice for using the actual equipment. On the other hand, "Time & Length" was rated as very low among all items. The reason was that the training hour in a day was too long. In addition, "Logistic arrangement" was a low rating. The reason was that a visit to the disposal station took 1 hour by bus in the Fall 2016. Therefore, the sites near to the academy were selected in the Spring 2017. However, the rate of "Logistic arrangement" was low. The reason might be the repetition of the internal activity and the field visit. The following is the explanation. The training period was reduced from 10 days in the Fall 2016 to 5 days in the Spring 2017. Due to the reduction, the activity in a day was carried out by internal activity, field activity, and internal activity. This repeated activity continued for 4 days, which might be too tight or too much movement for the trainees.

Table 3.23 Course Evaluation of O&M of Mechanical Equipment in Fall 2016 and Spring 2017

| Sr. No | How satisfied were you with: | Average* | |
|--------|--|-----------|-------------|
| | | Fall 2016 | Spring 2017 |
| 1 | Difficulty Level of Training Themes | 2.9 - 3.3 | 3.1 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 3.1 - 3.5 | 3.3 |
| 3 | Relevance of On-Site Training Activities | 3.0 - 3.7 | 3.3 |
| 4 | Overall Presentation Quality of Trainer | 3.2 - 3.3 | - |
| 5 | Trainer's Expertise on Topics and Topic Delivery Skills | 3.2 | 3.8 |
| 6 | Time & Length of Training | 2.5 - 2.9 | 2.9 |
| 7 | Practical Activities & Exercise at Class Room | 2.8 - 3.2 | 3.1 |
| 8 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc.) | 2.6 - 3.2 | 3.2 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 2.5 - 3.4 | 2.4 |
| 10 | Overall Quality of Training | 3.3 | - |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

v-b) Trainer's evaluation

Table 3.24 presents the trainer's evaluation, a summary of "Form B" (see Annex 3.39). The detail and the rest of answer for the course evaluation, "Form B" are presented in Annex 3.48 for the training in Fall 2016 and Annex 3.49 for the Spring 2017. Trainers were evaluated more or less

between "Good" and "Very Good" in the Fall 2016, and between "Very Good" and "Excellent" in the Spring 2017. English was used at most of the course work in Fall 2016. However, it looked that the trainees did not understand all. Therefore, in the training of Spring 2017, Urdu was fully used. It could be the reason that all items in the Spring 2017 tend to be higher ratings than the Fall 2016.

Table 3.24 Trainer's Evaluation of O&M of Mechanical Equipment in Fall 2016 and Spring 2017

| Sr. No | Items | Average* | |
|--------|---|-----------|-------------|
| | | Fall 2016 | Spring 2017 |
| 1 | Qualification & Experience | 3.3 - 4.3 | 4.3 - 4.6 |
| 2 | Technical Knowledge of the Content | 3.3 - 4.0 | 4.2 - 4.5 |
| 3 | Explanation of the Content | 3.2 - 4.0 | 4.1 - 4.3 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 3.3 - 4.0 | 4.2 - 4.5 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 3.2 - 4.2 | 4.4 - 4.7 |
| 6 | Management of on-site Training | 3.2 - 3.7 | 4.0 - 4.4 |
| 7 | Time Management | 3.2 - 3.7 | 3.5 - 4.2 |
| 8 | Presentation Skills | 3.2 - 4.4 | 4.1 - 4.6 |
| 9 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 3.3 - 4.1 | 4.3 - 4.6 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

v-c) Trainees' evaluation

The passing rates were at 47 % for the training in Fall 2016 and 100% for the Spring 2017 as presented in Table 3.9 and 3.10, respectively. Annex 3.48 and 3.49 for the Fall 2016 and the Spring 2017, respectively, indicate the details such as name of trainee, and the evaluation of attendance and assignment. The participants who failed attended less than 50% of the classes and/or did not submit the assignment. The reason of absence was mainly for the requirement of their daily work. The understanding from their seniors was one of the key issues for an improvement of the attendance rate. In addition, there were two participants who left the hostel without notice at the first day of the training. The academy issued the request letter for the clarification to their organization.

v-d) Revision to following training

The revision to the training in Spring 2017 from the Fall 2016 was discussed between the faculties of the academy and JICA Experts based on the comments from the trainees, listed in Annex 3.48. Table 3.25 is the main components of the revision.

Table 3.25 Major Revision to Training in Spring 2017 from Fall 2016
for O&M of Mechanical Equipment

| No. | Subject | Detail |
|---|--|---|
| Module: Centrifugal Pumps, Induction Motors and Valves / Chlorination and Filtration System | | |
| 1 | More time allocation to Practical Training | Reducing explanation by slide, and increasing more time for technical explanation with the actual tool/equipment. |
| 2 | Replacement of gland packing | Giving an opportunity to replace gland packing to trainees. |
| 3 | Chlorine dosage | Giving an opportunity to control chlorine dosage rate through demo-operation of chlorine pump at lecture room. |
| 4 | Language | More use of Urdu |
| Module: Heavy Machines / Water Meter Maintenance and Repair | | |
| 5 | Visit of heavy machine manufacturer | In order to give more advance O&M of heavy machines, a visit to a heavy machine manufacturer in Lahore is included. |
| 6 | Health Safety Equipment | Explaining based on more actual tool/equipment instead of explanation by slides |
| 7 | Visit of workshop for water meter at Lahore WASA | Visiting workshop for water meter in order to understand current O&M of water meter. |
| 8 | Language | More use of Urdu |

After the training in Spring 2017, the faculties of the academy and JICA Expert visited WASAs' field for OJT. Many issues were observed and improved through OJT. The revisions to Fall 2017 from Spring 2017 were to include these findings through OJT such as i) no data recording for pump operation, ii) lack of SOP for pump and valve operation, iii) lack of preventive maintenance plan for heavy machines, iv) use of non-standard parts, v) non-standard repair methods, and etc.. Some of them are listed in Table 3.25. For further enhancement of the understanding, the training in fall 2017 included to the actual pictures at WASA's site, discussion of the issues seen during the OJT, and more hands on training.

vi) Asset Management

vi-a) Course evaluation

The course for Asset Management was implemented only during the period of the training in Fall 2016 in the Second Project Year (see Table 3.8). Table 3.26 presents the course evaluation, a summary of Question No 1 to No 10 in "Form A" (see Annex 3.39) for Module 1&2, 3&4, and 5&6, separately evaluated. Annex 3.50 presents the detail and the rest of answer for the course evaluation, "Form A". The entire course was evaluated more or less as "Satisfied". "Time & Length of Training" was rated between "Somewhat Satisfied" and "Satisfied", which was lower as compared to the other items. The reason is that the class hour (9:30am - 4:00pm) in day was too long. Some trainees requested to the class hour until 2pm.

Table 3.26 Course Evaluation for Asset Management in Fall 2016

| Sr. No | How satisfied were you with: | Average* of Fall 2016 |
|--------|---|-----------------------|
| 1 | Difficulty Level of Training Themes | 2.9 - 2.7 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 2.9 - 3.1 |
| 3 | Relevance of On-Site Training Activities | 2.8 |
| 4 | Overall Presentation Quality of Trainer | 2.9 - 3.3 |
| 5 | Trainer's Expertise on Topics and Topic Delivery Skills | 2.8 - 3.2 |
| 6 | Time & Length of Training | 2.2 - 2.9 |
| 7 | Practical Activities & Exercise at Class Room | 3.0 - 3.2 |
| 8 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc. | 2.8 - 3.0 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 2.5 - 3.5 |
| 10 | Overall Quality of Training | 2.7 - 3.3 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

vi-b) Trainer's evaluation

Table 3.27 presents the trainer's evaluation, a summary of "Form B" (see Annex 3.39) for Module 1&2, 3&4, and 5&6, separately evaluated. Annex 3.50 presents the detail result of the trainer's evaluation, "Form B". All items of the trainer's evaluation by the trainees were rated more or less as "Very Good". This subject was new to most of the trainees. However, the delivery of the lecture was qualified since all trainers had the experience in their teaching field.

Table 3.27 Trainer's Evaluation for Asset Management in Fall 2016

| Sr. No | Items | Average* of Fall 2016 |
|--------|---|-----------------------|
| 1 | Qualification & Experience | 3.3 - 4.5 |
| 2 | Technical Knowledge of the Content | 3.4 - 4.4 |
| 3 | Explanation of the Content | 3.1 - 4.5 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 3.0 - 4.4 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 3.1 - 4.1 |
| 6 | Management of on-site Training | 3.0 - 3.9 |
| 7 | Time Management | 3.3 - 4.0 |
| 8 | Presentation Skills | 3.0 - 4.2 |
| 9 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 3.1 - 4.3 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

vi-c) Trainees' evaluation

The passing rate in this course was at 63% as presented in Table 3.9. Annex 3.50 indicates the details such as name of trainee, and the evaluation criteria of attendance and assignment. The participants who failed were seven. Their attendance rate was less than 50%. Three did not attend the course at all. Regarding the attendance, the key issue is the understanding from their seniors.

v-d) Revision to following training

The following training for Asset Management after the Fall 2016 was implemented in Fall 2017. The revision to the Fall 2017 was discussed between the faculties of the academy and JICA Experts based on the comments from the trainees, listed in Annex 3.50. Table 3.28 is the main components of the revision to the Fall 2017 from the Fall 2016.

Table 3.28 Major Revision to Training in Fall 2017 from Fall 2016 for Asset Management

| Module | | Duration (days) | | Revision |
|--------|--|-----------------|-----------|--|
| No. | Name | Fall 2016 | Fall 2017 | |
| 1 | Introduction of asset management | 3 | 2 | - Reducing time for basic classes of "Definition of assets" and "Reporting of assets in books of accounts". - Increasing time for introduction of case study on asset management. |
| 2 | Asset Management Information System (AMIS) | 2 | 1.5 | Eliminating a part of "Introduction of AMIS" which overlaps with Module 1 |
| 3 | Asset database analysis | 2 | 1.5 | Eliminating overlapped activities between "Replacement Planning" in Module 3 and "Asset Replacement Plan" in Module 4 |
| 4 | Asset replacement plan | 2 | 2 | |
| 5 | OJT 1 | 2 | 1.5 | The lecture of "Introduction of Condition rating" in Module 5 and "Introduction of GIS" in Module 6 are overlapped at some part of Module 1 - 3. These overlapped activities are eliminated. |
| 6 | OJT 2 | 4 | 1.5 | |

vii) Business Plan

vii-a) Course evaluation

The course for Business Plan was implemented only in Spring 2017 in the Second Project Year (see Table 3.8). Table 3.29 presents the course evaluation, a summary of Question No 1 to No 10 in "Form A" (see Annex 3.39) for Module 1&2, and 3 to 5, separately evaluated. The detail and the rest of answer for the course evaluation, "Form A" are presented in Annex 3.51. Most of the items were rated as "Satisfied" or higher. Among all items, "Time & Length of Training" was rated as the lowest. The reason was that the time was too short to cover all areas of training.

Table 3.29 Course Evaluation for Business Plan in Spring 2017

| Sr. No | How satisfied were you with: | Average* of Spring 2017 |
|--------|--|-------------------------|
| 1 | Difficulty Level of Training Themes | 3.1 - 3.2 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 3.2 - 3.8 |
| 3 | Relevance of On-Site Training Activities | - |
| 4 | Overall Presentation Quality of Trainer | 3.5 |
| 5 | Trainer's Expertise on Topics and Topic Delivery Skills | 3.4 - 3.5 |
| 6 | Time & Length of Training | 2.7 - 2.9 |
| 7 | Practical Activities & Exercise at Class Room | 3.2 - 3.5 |
| 8 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc.) | 2.8 - 3.2 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.3 - 3.6 |
| 10 | Overall Quality of Training | 3.2 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

vii-b) Trainer's evaluation

Table 3.30 presents the evaluation of 5 trainers, a summary of "Form B" (see Annex 3.39) for Module 1&2, and 3 to 5, separately evaluated. Annex 3.51 presents the detail result of the trainer's evaluation, "Form B". Almost all items of the trainer's evaluation by the trainees were rated as "Very Good" or higher. Such high evaluation might be explained that three out of five trainers had an experience to give lectures at universities.

Table 3.30 Trainer's Evaluation for Business Plan in Spring 2017

| Sr. No | Items | Average* of Spring 2017 |
|--------|---|-------------------------|
| 1 | Qualification & Experience | 4.0 - 4.8 |
| 2 | Technical Knowledge of the Content | 4.1 - 4.7 |
| 3 | Explanation of the Content | 4.0 - 4.4 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 4.2 - 4.4 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 4.2 - 4.5 |
| 6 | Management of on-site Training | - |
| 7 | Time Management | 3.9 - 4.5 |
| 8 | Presentation Skills | 4.1 - 4.8 |
| 9 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 4.1 - 4.5 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

vii-c) Trainees' evaluation

The passing rate in this course was 61% as presented in Table 3.10. Annex 3.51 indicates the details such as name of trainee, and the evaluation criteria of attendance and assignment. The participants who failed were seven. The attendance rates of the fails were less than 50%. Three did not attend the course at all. Regarding the attendance, the key issue was the understanding from their seniors.

vii-d) Revision to following Training

The revision to the training in Fall 2017 from Spring 2017 was discussed between the faculties of the academy and JICA Experts based on the comments from the trainees, listed in Annex 3.51.

Table 3.31 is the main components of the revision.

Table 3.31 Major Revision to Training in Fall 2017 from Spring 2017 for Business Plan

| Module | | Duration (days) | | Revision |
|--------|--|-----------------|-----------|--|
| No. | Name | Spring 2017 | Fall 2017 | |
| 1 | Business Plan and GAP analysis | 2 | 1.5 | Reducing time for general explanation of SWOP analysis and GAP analysis |
| 2 | Strategies for service delivery improvement | 3 | 2.5 | Reducing time for an explanation of "Best Practices on Benchmarking in Phnom Penn" due to difficulty of application at WASAs |
| 3 | Strategies for human resource development | 2 | 1.5 | Omitting duplication of PCM |
| 4 | Strategies for financial management | 1 | 1.5 | Increasing more practical exercise |
| 5 | Business plan formulation and implementation | 2 | 1 | Reducing time for preparing Business Plan due to possibility of time allocation in each module |
| Total | | 10 | 8 | |

[B-8] Preparation of OJT implementation procedure

In the training, the trainees prepared Action Plan and OJT Implementation Procedure. The action plan was more comprehensive plan. On the other hand, OJT Implementation Procedure was to indicate the specific activity with the checking items. Each WASA or participant's utilities prepared the action plan in the training. In case of OJT Implementation Procedure, each course had the same form. The form was subjected to adjustment based on the applicability in each WASA. Table 3.32 presents a list of Action Plan and OJT Implementation Procedure in Annex.

Table 3.32 Action Plan and OJT Implementation Procedure in Annex

| Name of Course | Fall 2016 | | Spring 2017 | |
|---------------------------------------|-----------------------------|------------------------------|---------------|------------------------------|
| | Action Plan | OJT Implementation Procedure | Action Plan | OJT Implementation Procedure |
| O&M of Tube Well and Pump Facility | Annex 3.52 | not prepared | Annex 3.64 | not prepared |
| Leak Detection | Annex 3.53 | Annex 3.58 | Annex 3.65 | Annex 3.58 |
| O&M of Sewer and Storm Water Drainage | not prepared | not prepared | Annex 3.66 | Annex 3.70 |
| O&M of Electrical Equipment | Annex 3.54, 3.55 | Annex 3.59 - 3.61 | Annex 3.67 | Annex 3.71 |
| O&M of Mechanical Equipment | Annex 3.56, 3.57 | Annex 3.62 | Annex 3.68 | Annex 3.62 |
| Asset Management | not planned for preparation | Annex 3.63 | not scheduled | |
| Business Plan | not scheduled | | Annex 3.69 | not planned for preparation |

[Activities in Output 3]

[B-9] Monitoring and technical advice against OJT implemented by trained staff at Al-Jazari Academy

As indicated in Table 3.32, Action Plan and OJT Implementation Procedure were prepared. Regard to or regardless of these documents, the faculties and JICA Experts visited the operational site and/or office of WASAs for improvement of their work. The following is the activity for each course.

(1) O&M of Tube Well and Pump Facility

The preparation of field work was implemented. All facilities of water supply and sewerage have been registered to GIS database. The basic data for this course is pipe network. Based on the GIS database, the faculty (Mr. Zia Mustafa) and JICA Expert (Mr. Takuji Okubo) visited Green Town Division of Lahore WASA near Al-Jazari Academy. According to the database, there are 6 aqueducts over the drainage. However, only three were located as registered in the database. One was found at much downstream of the database. Two were not found. Regarding OJT activity, the further discussion was required.

(2) Leak Detection

The equipment for leak detection was leased to 5 WASAs from Al-Jazari Academy on March 16, 2017. After that, the faculties (Mr. Zia Mustafa, Mr. Rizwan Jabbar, Mr. Muhammad Faisal) visited WASAs as presented in Table 3.33, and trained in the field how to install and operate the equipment such as ultrasonic flow meter, pressure recorder, non-metal pipe locator, metal pipe locator, acoustic leak detector, acoustic bar, metal detector, and distance measure.

Table 3.33 Number of Participants for Training at Field of WASAs

| WASA | Date of visit | No of participants |
|------------|-------------------|--------------------|
| Gujranwala | April 5-6, 2017 | 1 |
| Rawalpindi | April 10-11, 2017 | 20 |
| Faisalabad | April 17-18, 2017 | 55 |

(3) O&M of Sewer and Storm Water Drainage

Follow-up visits to WASAs by the faculties were conducted and observed about the safety implementation by workers such as wearing helmet or reflective vest, etc. as presented in Table 3.34. It was observed that the workers wore helmet and reflective vest at 5 WASAs. The results of the site visit are attached in Annex 3.72.

Table 3.34 Safety Exercise by Observation during Follow-up Visit to WASAs in "O&M of Sewer and Storm Water Drainage"

| WASA | Date of visit | Safety implementation | | | | | Visitors | |
|-------------|------------------|-----------------------|-----------------|---------------------|-------------------------|--------------------------------------|---|-----------------|
| | | Helmet | Reflective vest | Boots, safety shoes | Gas detector / gas mask | Safety control by safety tape / cone | Faculties | JICA Expert |
| Lahore* | Jan 27, 2017 | yes | few worker | no | no | no needed | Mr. Muhammad Irfan Ms. Ammara Asif Ms. Maryam Rabbani | - |
| Faisalabad* | Mar 15, 16, 2017 | yes | yes | no | yes | yes | Mr. Muhammad Irfan | Mr. Yusuke Ando |
| Gujranwala | Feb 8, 2017 | yes | yes | yes | not observed | yes | Mr. Muhammad Irfan | Mr. Yusuke Ando |
| Multan* | Mar 21, 22, 2017 | yes | yes | yes | no | no | Mr. Muhammad Irfan | Mr. Yusuke Ando |
| Rawalpindi* | Mar 17, 2017 | yes | yes | yes | no | no | Mr. Muhammad Irfan | Mr. Yusuke Ando |

Note: * referred to Annex 2.70

(4) O&M of Electrical Equipment

OJT activity for solving an issue on pump operation by burning of motor was implemented at WASA Multan from March 27-30, 2017. The reason of the burning was expected due to bypass of protective relays installed for a motor of pump. Through the following activities, the new issue was found. This issue was included in the training of Spring 2017 through the following steps of the activities.

- 1) checking of protective relays setting
- 2) replacement of protective relays
- 3) observation of the signal from protective relays - but no proper signal
- 4) identification of an issue on new parts (sub-standard components)
- 5) provision of training to staff of WASA Multan how to check new device such as protective relays on site
- 6) inclusion of this lesson to training contents at Al-Jazari Academy

(5) O&M of Mechanical Equipment

The faculties of Al-Jazari Academy visited WASAs as presented in Table 3.35. The activity was i) a discussion with WASA staff regarding the application of template in the training at the academy, and ii) the site visit to tubewell, disposal station, heavy equipment storage, and filtration plant.

Table 3.35 Visit to WASAs for O&M of Mechanical Equipment

| WASA | Date | Faculties |
|------------|---------------|---|
| Multan | Feb 2-3, 2017 | - Mubashar Ahmed Cheema - Ihsan-ul-haque Javed - Tanveer Shehzad - Syed Fahad Hussain - Muhammad Fasial |
| Faisalabad | Feb 6, 2017 | - Mubashar Ahmed Cheema - Zia Mustafa - Ihsan-ul-haque Javed - Tanveer Shehzad - Syed Fahad Hussain - Muhammad Fasial - Muhammad Rizwan |
| Gujranwala | Feb 8, 2017 | - Mubashar Ahmed Cheema - Ihsan-ul-haque Javed - Jawad Shahid - Tanveer Shehzad - Syed Fahad Hussain |
| Rawalpindi | Feb 9, 2017 | - Mubashar Ahmed Cheema - Ihsan-ul-haque Javed - Jawad Shahid - Tanveer Shehzad - Syed Fahad Hussain |

(6) Asset Management

Initial activities of Asset Management at WASAs focused on obtaining more accurate information of asset condition, and preparing GIS map. On February 23, 2017, the trainers of this course (Mr. Asif Iqbal, Mr. Ali Qumain) and JICA Expert (Mr. Yasuyuki Kuroda) visited WASA Gujranwala. In addition, on March 9, 2017, the trainers (Ms. Aneeqa Azeem, Mr. Ali Qumain) and JICA Expert (Mr. Yasuyuki Kuroda) visited WASA Lahore. On both visits, the discussion with MD of WASAs was i) to select pilot area, ii) to obtain the accurate information of asset condition, iii) to prepare GIS map, iv) to hold workshop in June 2017, and v) to provide necessary support by the trainers from Urban Unit.

4 Activities in Third Project Year (August 2017 - June 2018)

4.1 Work Flowchart

The work flowchart is presented in Annex 2.1. The detail activity plan described for responsible JICA experts and counterparts in each work activity is attached in Annex 2.2.

4.2 Progress for General Activity

[General]

[C-1] Assistance for training program in Japan

As the training in Japan, "Improvement of daily field activities in water and sewerage sector" was held from January 21 - 27, 2018. The aim of the training was to obtain knowledge on i) O&M of water and sewerage equipment such as pumps and valves, ii) leak detection activity, and iii) sewer pipe cleaning. Annex 4.1 presents a list of the trainees.

[C-2] Assistance for inviting lecturer

JET was not requested for necessary assistance regarding an invitation of lecturers from outside of Pakistan.

[C-3] Progress monitoring

Project monitoring sheet Ver. 4 and Ver. 5 describe the activities from February to September 2017, and from October 2017 to March 2018, respectively. The sheets were submitted to JICA.

[C-4] Finalization for training system of Al-Jazari Academy

Preparation of Training Guideline

The training guidelines were prepared through a discussion with the faculties of the academy from August 22 - 30, 2017 as attached in Annex 4.2. The contents of the guidelines include basic policy, purpose, goal, methodology for the training, etc..

Methodology for Training Needs Assessment

The methodology for the training needs assessment shall be discussed on the consideration of the status for WASA's operation. Currently, the relation of the service level of WASA and the issues could be described in Fig. 4.1 through OJT activities at the field of WASAs.

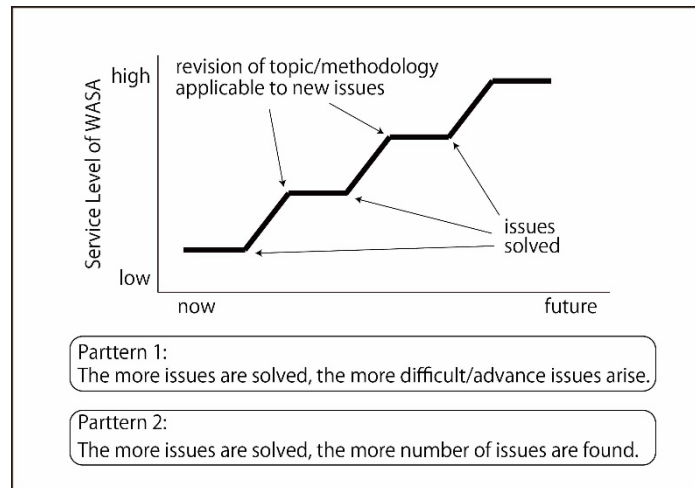


Fig. 4.1 Conceptual Figure for Revision of Topic/Methodology for Trainings

In every OJT, there were new findings such as i) an issue on new parts of electrical equipment, ii) incomplete closing of sluice valve due to rust, and iii) no installation of water tank for lubricant requiring a proper life span of pump bearing, etc.. Whenever issues were found, the faculties tried to solve it. Then some were solved. Based on these experiences, the training topics/methodologies were revised for meeting the needs of WASAs. Therefore, the training needs are continuously assessed through OJT.

Evaluation for Training System

The definition of the training system is the budget management, logistic, and training evaluation, which is described in "2 Activities in First Project Year (July 2015 - June 2016)" > "2.2 Progress for General Activity" > "[A-9], (1), 4)". During the project, this system ran appropriately. Regarding the evaluation for the training and the trainers, the questionnaires of Annex 3.39 and 4.3 as shown in Table 4.5 were used. The answers by the trainees to the questionnaire and its feedback/revision are described and discussed in "3 Activities in Second Project Year (August 2016 - June 2017)" > "3.2 Progress for General Activity" > "[B-7]", and "4 Activities in Third Project Year (August 2017 - June 2018)" > "4.2 Progress for General Activity" > "[C-7]".

OJT Activities

Refer to "3 Activities in Second Project Year (August 2016 - June 2017)" > "3.2 Progress for General Activity" > "[B-9]", and "4 Activities in Third Project Year (August 2017 - June 2018)" > "4.2 Progress for General Activity" > "[C-8]".

[C-5] Preparation of Draft Final Report (DFR) and Final Report (FR)

The project activities and outputs were summarized in Draft Final Report (hereinafter referred to as "DFR"). After an approval of JICA, JCC discussed the contents of DFR. According to the result of the discussion, Final Report was prepared and submitted to JICA.

[Activities in Output 1]

[C-6] Finalization of training operational and management plan

Originally the activity of [C-6] was to finalize the training operation and management plan consisting of the framework of the training, the curriculum, assessment, certification, the training course, the material, and allocation of lecturers and supporting staff in consideration of sustainable training system after the project. However, as shown in Fig. 4.1, the training activities shall be continuously revised. Therefore, the annual training schedule, the curriculum, the training course, and the training materials shall be continuously revised, too. The latest versions of them are referred in Table 4.1, Table 4.2, Annex 4.34, and Annex 4.35. Note that the date of the annual training schedule will be adjusted to the implementing year.

The organization chart of the academy is presented in Fig. 1.1. Regarding the training operation and management, the required tasks were assigned to each staff based on the responsibility described in Annex 1.5. As a result, the trainings were implemented as scheduled. Therefore, the current training operation and management processes shall be continued and applied for the upcoming training.

[Activities in Output 2]

[C-7] Provision of training courses for each subject

(1) Training on Presentation Skill

The presentation skill was trained to Mr. Ihsan ul haque Javed, Sr. Instructor (Health & Safety) from March 7 to 12, 2018 by Mr. Ken Yokoyama, JICA Expert. Based on the demonstrating the lecture, Mr. Yokoyama advised that i) size of letters in slide, ii) indication of slide number, iii) presenting drawings or pictures, iv) movement during speaking, and v) interactive lecture between a trainer and trainees. The presentation skill was improved through this training.

In addition, the academy started the training program for a presentation skill improvement of young professionals from February 16, 2018. Annex 4.4 indicates the program schedule and the presentation topics. At the end of the presentation, the audience of the other faculties and JICA Experts gave the comments to the presenter such as structure of slides, speaking speeds, entire contents and so on. On April 20, 2018, Mr. Muhammad Irfan, a faculty of the academy, prepared voluntarily and shared the evaluation form for the presentation skill program (see Annex 4.5). This type of the internal improvement program is directly connected to the sustainability of the academy.

(2) Implementation of Training Courses

The annual training plan from October 2017 to April 2018 is shown in Table 4.1. The training was scheduled with consideration of avoiding the overlapping and keeping one week between the courses as much as possible.

Table 4.1 Annual Training Implementation Plan from October 2017 to April 2018

| Course | Module | Fall 2017 | Spring 2018 |
|---------------------------------------|--|----------------|--|
| O&M of Tube Well and Pump Facility | O&M of Water Distribution System | Dec 4 - 7 | Mar 5 - 8 (rescheduled to Mar 19 - 22)* |
| Leak Detection | 1. Basic knowledge of Leakage Prevention Work / 2. Leakage detection and repair at the site (OJT) / 3. Install & operation of the equipment at the site (OJT) | Oct 16 - 20 | Apr 16 - 19 |
| O&M of Sewer and Storm Water Drainage | 1. Safety control and measure for sewerage and drainage 2. Operation and maintenance of drainage system 3. Operation and maintenance of sewer system | Oct 2 - 6 | Feb 19 - 23 |
| O&M of Electrical Equipment | 1. Electrical Panel and Instrumentation Equipment 2. Generators | Dec 11 - 15 | Mar 26 - 30 |
| O&M of Mechanical Equipment | 1. Centrifugal Pumps, Induction Motors and Valves / 2. Chlorination and Filtration System 3. Water Meter Maintenance and Repair / 4. Heavy Machines | Jan 1 - 5 | Apr 9 - 13 |
| Asset Management | 1. Introduction of Asset Management and Asset Management Information System (AMIS) 2. Risk Management of Asset 3. Asset Database Analysis 4. Asset Replacement Plan 5. Asset Condition Assessment (including field work) 6. GIS | Oct 30 - Nov 4 | Jan 15 - 20 |
| Business Planning | 1. Business Planning & GAP analysis 2. Strategies for Service Delivery Improvements 3. Strategies for Human Resource Development 4. Strategies for Financial Management System 5. Business plan formulation and implementation | Nov 13 - 22 | Jan 25 - Feb 2 |

Note *: Due to less nomination, the training was rescheduled.

The training schedule indicating class name and time, and the training materials are attached in Annex as summarized in Table 4.2. The training curriculum with evaluation criteria for the training in Fall 2017 and Spring 2018 is attached in Annex 4.34 and 4.35, respectively.

Table 4.2 Training Schedules and Materials in Fall 2017 and Spring 2018

| Name of Course | Fall 2017 | | Spring 2018 | |
|---------------------------------------|-------------------|-------------------|-------------------|-------------------|
| | Training Schedule | Training Material | Training Schedule | Training Material |
| O&M of Tube Well and Pump Facility | Annex 4.6 | Annex 4.13 | Annex 4.20 | Annex 4.27 |
| Leak Detection | Annex 4.7 | Annex 4.14 | Annex 4.21 | Annex 4.28 |
| O&M of Sewer and Storm Water Drainage | Annex 4.8 | Annex 4.15 | Annex 4.22 | Annex 4.29 |
| O&M of Electrical Equipment | Annex 4.9 | Annex 4.16 | Annex 4.23 | Annex 4.30 |
| O&M of Mechanical Equipment | Annex 4.10 | Annex 4.17 | Annex 4.24 | Annex 4.31 |
| Asset Management | Annex 4.11 | Annex 4.18 | Annex 4.25 | Annex 4.32 |
| Business Planning | Annex 4.12 | Annex 4.19 | Annex 4.26 | Annex 4.33 |

The number of participants and pass/fail for the training in Fall 2017 and Spring 2018 are summarized in Table 4.3 and 4.4, respectively.

Table 4.3 Number of Participants for Training in Fall 2017

| Name of Course | LHR ^{*1)} | FSD ^{*2)} | MUL ^{*3)} | GUJ ^{*4)} | RWL ^{*5)} | Others | Total | Pass ^{*6)} | Fail ^{*6)} | Pass Rate ^{*6)} |
|---------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------|-------|---------------------|---------------------|--------------------------|
| O&M of Tube Well and Pump Facility | 6 | 2 | 2 | 1 | 2 | 4 | 17 | 17 | 0 | 100% |
| Leak Detection | 8 | 2 | 2 | 2 | 2 | 3 | 19 | 19 | 0 | 100% |
| O&M of Sewer and Storm Water Drainage | 9 | 0 | 2 | 2 | 0 | 3 | 16 | 15 | 1 | 94% |
| O&M of Electrical Equipment | 6 | 2 | 2 | 1 | 1 | 2 | 14 | 12 | 2 | 86% |
| O&M of Mechanical Equipment | 5 | 2 | 2 | 2 | 2 | 2 | 15 | 15 | 0 | 100% |
| Asset Management | 7 | 1 | 2 | 2 | 2 | 0 | 14 | 8 | 6 | 57% |
| Business Planning | 9 | 2 | 2 | 2 | 2 | 0 | 17 | 15 | 2 | 88% |
| Total | 50 | 11 | 14 | 12 | 11 | 14 | 112 | 101 | 11 | 90% |

Note:

*1: Lahore WASA, *2: Faisalabad WASA, *3: Multan WASA, *4: Gujranwala WASA

*5: Rawalpindi WASA, *6: refer to "trainee's evaluation" in each course

Table 4.4 Number of Participants for Training in Spring 2018

| Name of Course | LHR ^{*1)} | FSD ^{*2)} | MUL ^{*3)} | GUJ ^{*4)} | RWL ^{*5)} | Others | Total | Pass ^{*6)} | Fail ^{*6)} | Pass Rate ^{*6)} |
|---------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------|-------|---------------------|---------------------|--------------------------|
| O&M of Tube Well and Pump Facility | 9 | 2 | 2 | 0 | 0 | 3 | 16 | 15 | 1 | 94% |
| Leak Detection | 8 | 0 | 2 | 0 | 2 | 3 | 15 | 15 | 0 | 100% |
| O&M of Sewer and Storm Water Drainage | 9 | 2 | 2 | 2 | 2 | 4 | 21 | 20 | 1 | 95% |
| O&M of Electrical Equipment | 9 | 2 | 2 | 1 | 1 | 5 | 20 | 20 | 0 | 100% |
| O&M of Mechanical Equipment | 9 | 2 | 1 | 1 | 2 | 4 | 19 | 19 | 0 | 100% |
| Asset Management | 6 | 0 | 2 | 1 | 2 | 4 | 15 | 13 | 2 | 87% |
| Business Planning | 3 | 2 | 2 | 0 | 2 | 5 | 14 | 12 | 2 | 86% |
| Total | 53 | 10 | 13 | 5 | 11 | 28 | 120 | 114 | 6 | 95% |

Note:

*1: Lahore WASA, *2: Faisalabad WASA, *3: Multan WASA, *4: Gujranwala WASA

*5: Rawalpindi WASA, *6: refer to "trainee's evaluation" in each course

The summary of a) evaluation for course and trainer, b) trainee's evaluation, and c) suggestion to training after this project is described separately in each course below. The course and the trainers were evaluated by the trainees based on the questionnaires as listed in Table 4.5.

Table 4.5 Evaluation Form by Trainees

| Name of Course | Fall 2017 | Spring 2018 |
|---------------------------------------|------------|-------------|
| O&M of Tube Well and Pump Facility | Annex 4.3 | Annex 4.3 |
| Leak Detection | Annex 3.39 | |
| O&M of Sewer and Storm Water Drainage | | |
| O&M of Electrical Equipment | Annex 4.3 | |
| O&M of Mechanical Equipment | | |
| Asset Management | Annex 3.39 | |
| Business Planning | | |

Forms for the questionnaire were prepared separately as "Form A" for course evaluation, and "Form B" for trainer's evaluation shown in Annex 3.39. However, similar questions were listed in "Form A" and "Form B". In addition, the number of questions were too many. More effective comments might

have been written if the number of questions was reduced. The faculties of the academy and JICA Experts discussed the revision of the questionnaire. As a result, "Form A" and "Form B" were merged together for reducing the number of questions as attached in Annex 4.3.

i) O&M of Tube Well and Pump Facility

The training course of "O&M of Tube Well and Pump Facility" in Spring 2018 was originally scheduled from 5th to 8th of March, 2018. However, against the capacity of 20, only 4 participated in the first day of the training. In the second day, the participation was 6. Regarding the implementation of the course, the academy has the regulation for minimum participation as more than half of the capacity. Since this situation of a few participants was against the regulation, it was once canceled on the second day. Then Project Coordination Committee (hereinafter referred to as "PCC") on March 16, 2018 discussed this issue, and agreed to reschedule this course from 19th to 22nd of March, 2018.

i-a) Evaluation for course and trainer

Table 4.6 presents an evaluation for the course and the trainer based on Form of Annex 4.3. In the training of Fall 2017, "Logistic Arrangement" was rated as extremely low. The reasons were that i) food quality was not good, and ii) the room was not properly cleaned according to the comments by the trainees (see Annex 4.36). This issue was taken very seriously and discussed for the improvement. As a result, it was improved to the rating of between "Satisfied" and "Very Satisfied" in the training of Spring 2018. This positive result was brought by the improvement action based on the discussion among the faculty members. The other items are the technical evaluation to the course and the trainer. These were rated more or less between "Satisfied" and "Very Satisfied" in the Fall 2017 and the Spring 2018.

Table 4.6 Course Evaluation for O&M of Tube Well and Pump Facility
in Fall 2017 and Spring 2018

| Sr. No | How satisfied were you with: | Average* | |
|-----------|---|-----------|----------------|
| | | Fall 2017 | Spring 2018 |
| 1 | Class Lectures | 3.6 | 3.3 |
| 2 | Class Exercise | 3.6 | 3.4 |
| 3 | Field activities/exercises during site visit | 3.5 | 3.3 |
| 4 | Quality of training materials (PPT slides, handouts, lecture notes, models, SOP formats etc.) | 3.6 | 3.3 |
| 5 | Schedule & Length of training | 3.4 | 2.7 |
| 6 | Technical knowledge of the trainer | 3.9 | 3.5 |
| 7 | Presentation skills of the trainer | 3.9 | 3.5 |
| 8 | Training relevant to your job duties | 2.9 | 3.6 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 1.9 | 3.5 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

i-b) Trainees' evaluation

The passing rates in this course were at 100% for the Fall 2017 and 94% for the Spring 2018, as presented in Table 4.3 and 4.4, respectively. Annex 4.36 and 4.37 for the Fall 2017 and the Spring 2018, respectively, indicate the details such as name of trainee, and the evaluation of attendance and assignment. The fail was only one in the Spring 2018. The reason of the fail was mainly less submission of the assignment and low attendance rate.

i-c) Suggestion to Training after this Project

The hydraulic model was prepared in order to understand hydraulic head loss visibly. This phenomena occurs based on Bernoulli's principle, which is the basic concept of hydraulic characteristics. In the next training, this model shall be extensively applied in order to enhance the understanding of hydraulic characteristics.

ii) Leakage Detection

ii-a) Evaluation for course and trainer

For the training in Fall 2017, "Form A" and "Form B" of Annex 3.39 were applied for the evaluation of the course and the trainer. In case of the training in Spring 2018, Annex 4.3 was applied for an evaluation for the course and the trainer as presented in Table 4.5. Table 4.7 to 4.9 are the summaries of the evaluation presented in Annex 4.38 and 4.39.

As presented in Table 4.7 to 4.9, the ratings were "Satisfied", "Very Good" or better. JICA Expert also observed an improvement of technical knowledge through the repeated activities. In the training of Spring 2018, the time for using equipment was increased. In addition, Mr. Abid Hussain Najam, Assistant Director (Leak Detection Cell), Lahore WASA was invited as a guest speaker. The further improvement could be suggested as i) more interaction between the trainees and trainer, and ii) inclusion of more case study and field training.

Table 4.7 Course Evaluation for Leakage Detection in Fall 2017

| Sr. No | How satisfied were you with: | Average* |
|--------|--|-----------|
| | | Fall 2017 |
| 1 | Difficulty Level of Training Content | 3.4 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 3.6 |
| 3 | Relevance of On-Site Training Activities | 3.5 |
| 4 | Overall Presentation Quality of Trainer | 3.8 |
| 5 | Trainer's Expertise on Topics and Topic Delivery Skills | 3.6 |
| 6 | Time & Length of Training | 3.1 |
| 7 | Practical Activities & Exercise at Class Room | 3.4 |
| 8 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc.) | 3.4 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.7 |
| 10 | Overall Quality of Training | 3.6 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

Table 4.8 Trainer's Evaluation for Leakage Detection in Fall 2017

| Sr. No | How satisfied were you with: | Average* |
|--------|---|-----------|
| | | Fall 2017 |
| 1 | Qualification & Experience | 4.4 |
| 2 | Technical Knowledge of the Content | 4.4 |
| 3 | Explanation of the Content | 4.1 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 4.3 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 4.5 |
| 6 | Management of on-site Training | 4.2 |
| 7 | Time Management | 4.4 |
| 8 | Presentation Skills | 4.4 |
| 9 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 4.1 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

Table 4.9 Evaluation on Course and Trainer for Leak Detection in Spring 2018

| Sr. No | How satisfied were you with: | Average* |
|--------|---|-------------|
| | | Spring 2018 |
| 1 | Class Lectures | 3.7 |
| 2 | Class Exercise | 3.7 |
| 3 | Field activities/exercises during site visit | 3.8 |
| 4 | Quality of training materials (PPT slides, handouts, lecture notes, models, SOP formats etc.) | 3.8 |
| 5 | Schedule & Length of training | 3.3 |
| 6 | Technical knowledge of the trainer | 3.8 |
| 7 | Presentation skills of the trainer | 3.6 |
| 8 | Training relevant to your job duties | 3.8 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.6 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

ii-b) Trainees' evaluation

The passing rate in the training of Fall 2017 and the Spring 2018 was at 100%, as presented in Table 4.3 and 4.4, respectively. Annex 4.38 and 4.39 for the Fall 2017 and the Spring 2018, respectively, indicate the details such as name of trainee, and the evaluation of attendance and assignment.

ii-c) Suggestion to Training after this Project

The field training facility for this course was installed at the academy. The facility gives the opportunity of listening to the leaking sound traveling on various types of pipes at various distances from the leaking point under various quantities of leakage. This course shall use this facility for being familiar with the leaking sound.

iii) O&M of Sewer and Storm Water Drainage

iii-a) Evaluation for course and trainer

For the training in Fall 2017, "Form A" and "Form B" of Annex 3.39 were applied for the evaluation of the course and the trainer. In case of the training in Spring 2018, Annex 4.3 was applied for an evaluation of the course and the trainer as presented in Table 4.5. Table 4.10 to 4.12 are the summary

of the evaluation presented in Annex 4.40 and 4.41.

Almost all items are rated as "Satisfied" or better. JICA expert observed that the trainer implemented the training stably in the lecture and the field activity. However, there were the comments from the trainees in the Spring 2018 as i) more concise explanation related to theory, ii) more field activities, and iii) less numbers of trainees comprising the group in the field activities (see Annex 4.41). These are very important comments for improving the training.

Table 4.10 Course Evaluation for O&M of Sewer and Storm Water Drainage in Fall 2017

| Sr. No | How satisfied were you with: | Average* |
|--------|--|-----------|
| | | Fall 2017 |
| 1 | Difficulty Level of Training content | 3.3 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 3.4 |
| 3 | Relevance of On-Site Training Activities | 3.4 |
| 4 | Overall Presentation Quality of Trainer | 3.6 |
| 5 | Trainer's Expertise on Topics and Topic Delivery Skills | 3.6 |
| 6 | Time & Length of Training | 2.7 |
| 7 | Practical Activities & Exercise at Class Room | 3.4 |
| 8 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc.) | 3.0 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.0 |
| 10 | Overall Quality of Training | 3.2 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

Table 4.11 Trainer's Evaluation for O&M of Sewer and Storm Water Drainage in Fall 2017

| Sr. No | How satisfied were you with: | Average* |
|--------|---|-----------|
| | | Fall 2017 |
| 1 | Qualification & Experience | 4.1 |
| 2 | Technical Knowledge of the Content | 3.9 |
| 3 | Explanation of the Content | 4.2 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 4.3 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 4.1 |
| 6 | Management of on-site Training | 4.2 |
| 7 | Time Management | 4.1 |
| 8 | Presentation Skills | 4.6 |
| 9 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 4.6 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

Table 4.12 Evaluation on Course and Trainer for O&M of Sewer and Storm Water Drainage in Spring 2018

| Sr. No | How satisfied were you with: | Average* |
|--------|---|-------------|
| | | Spring 2018 |
| 1 | Class Lectures | 3.8 |
| 2 | Class Exercise | 3.7 |
| 3 | Field activities/exercises during site visit | 3.7 |
| 4 | Quality of training materials (PPT slides, handouts, lecture notes, models, SOP formats etc.) | 3.7 |
| 5 | Schedule & Length of training | 3.1 |
| 6 | Technical knowledge of the trainer | 4.0 |
| 7 | Presentation skills of the trainer | 3.9 |
| 8 | Training relevant to your job duties | 3.5 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.7 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

iii-b) Trainees' evaluation

The passing rates in this course were at 94% for the Fall 2017 and 95% for the Spring 2018 as presented in Table 4.3 and 4.4, respectively. Annex 4.40 and 4.41 indicate the details such as name of trainee, and the evaluation of attendance and assignment for the training in Fall 2017 and Spring 2018, respectively. Only one trainee failed for both training in Fall 2017 and Spring 2018. The failing reason in the Fall 2017 was un-submission of the assignments and low attendance rate. In case of the Spring 2018, less submission of the assignment was the main reason for the failing.

iii-c) Suggestion to Training after this Project

As mentioned in iii-a) above, there were the comments from the trainees in the Spring 2018 as i) more concise explanation related to theory, ii) more field activities, and iii) numbers of trainees at a maximum of 5 in each group during the outdoor activities (see Annex 4.41). Following the comments, the training shall be upgraded. In addition, it could be included for the enhancement of basic understanding such as i) rough estimation of velocity and discharge rate at open channel, ii) unit conversion of discharge rate such as ft^3/s and m^3/s , and iii) excel calculation for estimating sludge volume, and required time for sludge removal works and its transportation, etc.

iv) O&M of Electrical Equipment

iv-a) Evaluation for Course and Trainers

The questionnaire form of Annex 4.3 was applied for an evaluation of the course and the trainers. Two trainers implemented the training. The trainees evaluated each trainer. Therefore, there are two answers for the questionnaire. Table 4.13 summarizes the evaluation in the Fall 2017 and the Spring 2018 based on the results presented in Annex 4.42 and 4.43, respectively.

As presented in Table 4.13, all items are rated between "Satisfied" and "Very Satisfied". The trainers implemented the training stably with confidence. The extensive OJTs were applied at 5 WASAs. Through these OJT, the trainers learned the actual field situation together with WASA staff. In addition, the trainers had an idea of the necessary approach and supporting contents for the upcoming training. This action of "doing - thinking - upgrading" gave the confidence to the trainers. In addition, the trainers spoke about the experience on OJT at WASAs. These are main reasons for the high rating.

Table 4.13 Course Evaluation for O&M of Electrical Equipment in Fall 2017 and Spring 2018

| Sr. No | How satisfied were you with: | Average* | |
|--------|---|-----------|-------------|
| | | Fall 2017 | Spring 2018 |
| 1 | Class Lectures | 3.7, 3.9 | 3.6, 3.9 |
| 2 | Class Exercise | 3.7 | 3.6, 3.8 |
| 3 | Field activities/exercises during site visit | 3.6, 3.7 | 3.6, 3.9 |
| 4 | Quality of training materials (PPT slides, handouts, lecture notes, models, SOP formats etc.) | 3.8, 3.9 | 3.6, 3.7 |
| 5 | Schedule & Length of training | 3.1 | 3.3, 3.4 |
| 6 | Technical knowledge of the trainer | 3.8, 3.9 | 3.8, 3.9 |
| 7 | Presentation skills of the trainer | 3.9, 4.0 | 3.8, 3.9 |
| 8 | Training relevant to your job duties | 3.6, 3.8 | 3.5 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.3, 3.4 | 3.6, 3.7 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

iv-b) Trainees' evaluation

The passing rates were at 86% in the Fall 2017 and 100% in the Spring 2018 as presented in Table 4.3 and Table 4.4, respectively. The fails were 2 in the Fall 2017. The reason for the fail was less submission of the assignment and/or less attendance rate. Annex 4.42 and 4.43 indicate the details such as name of trainee, and the evaluation of attendance and assignment for the Fall 2017 and the Spring 2018, respectively.

iv-c) Suggestion to Training after this Project

As mentioned in "iv-a) Evaluation for Course and Trainers" in this course, the trainees learned the actual field conditions through OJT, and found the necessary approach and supporting contents for the upcoming training. These activities shall be continued because these are directly connected to the upgrading.

v) O&M of Mechanical Equipment

v-a) Evaluation for Course and Trainers

The questionnaire form of Annex 4.3 was applied for an evaluation of the course and the trainers. Two trainers implemented the training. The trainees evaluated each trainer. Therefore, there were two answers for the questionnaire. Table 4.14 summarizes the evaluation in the Fall 2017 and the Spring 2018 based on the results presented in Annex 4.44 and 4.45, respectively.

As presented in Table 4.14, "Schedule and length of training" was rated more or less between "Somewhat Satisfied" and "Satisfied", which was the lowest among all items for the Fall 2017 and the Spring 2018. This training course included various topics such as pump, valve, water meter, chlorination, arsenic removal, heavy machine, and HSE (Health, Safety, and Environment) in 5 days. Therefore, the time for each topic might not be enough to train the trainees. If the same number of topics is applied, the efficient and effective training is required. In that case, one of the solutions was

to reduce the lecture and to increase interactive activity by use of tools, equipment, or model. Actually the practical trainings has been continuously increased more than the previous training in this course. In the training of Spring 2018, the miniature model of pump station was included in order to enhance the understanding of the pump station. In addition, the exercise for connecting a water meter and pipes was included in the Spring 2018. In order to increase such trainings, some arrangements were made such as reducing the number of the slides for the lecture, and reducing some exercises. This type of the upgrading shall be applied continuously.

Table 4.14 Course Evaluation for O&M of Mechanical Equipment in Fall 2017 and Spring 2018

| Sr. No | How satisfied were you with: | Average* | |
|--------|---|-----------|-------------|
| | | Fall 2017 | Spring 2018 |
| 1 | Class Lectures | 3.3, 3.4 | 3.5, 3.8 |
| 2 | Class Exercise | 3.1, 3.2 | 3.4, 3.5 |
| 3 | Field activities/exercises during site visit | 2.9, 3.4 | 3.4, 3.5 |
| 4 | Quality of training materials (PPT slides, handouts, lecture notes, models, SOP formats etc.) | 3.2, 3.3 | 3.3, 3.5 |
| 5 | Schedule & Length of training | 2.3, 2.8 | 3.2 |
| 6 | Technical knowledge of the trainer | 3.4, 3.6 | 3.5, 3.6 |
| 7 | Presentation skills of the trainer | 3.5 | 3.5, 3.9 |
| 8 | Training relevant to your job duties | 2.9, 3.3 | 3.3 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.1, 3.3 | 3.4 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

v-b) Trainees' evaluation

The passing rate for the Fall 2017 and Spring 2018 was at 100 % as presented in Table 4.3 and 4.4, respectively. Annex 4.44 and 4.45 indicate the details such as name of trainee, and the evaluation of attendance and assignment.

iv-c) Suggestion to Training after this Project

As mentioned in iv-a) above, the practical exercise shall be increased continuously more than the previous training. In addition, Mr. Tanveer Shahzad, Young Professional, lectured about valves such as sluice valve, non-return valve, butterfly valve, and air valve, etc.. It was the first action of a Young Professional to be a trainer in this course. If he becomes a stable lecturer about this topic and the others, two trainers will be available in the technical topics of this course. This action shall be continued because it contributes to the sustainability of the academy.

vi) Asset Management

vi-a) Evaluation for Course and Trainers

In the training of Fall 2017, "Form A" and "Form B" of Annex 3.39 was applied for an evaluation of the course and the trainer. In case of the training in Spring 2018, Annex 4.3 was applied for an evaluation of the course and the trainer as presented in Table 4.5. Table 4.15 to 4.17 are the summaries of the evaluation presented in Annex 4.46 and 4.47.

Between October 2016 and April 2017, this course was implemented only one time in Fall 2016. Therefore, the training in the Fall 2017 was the second time. In the Fall 2016, the duration of the training course was 15 days. After requested by Lahore WASA, all course was basically designed in the duration of 5 days. In this course, the duration in Fall 2017 was reduced to 6 days without reducing modules. Therefore, the time for each module was also reduced. It might be the reason that the rating of the Fall 2017 was lower as compared to the other courses. On the other hand, the trainers were rated as more or less "Very Good". The trainers have the experience of teaching at universities. This may be the main reason of high rating. Reviewing the Fall 2017, the training in Spring 2018 was implemented with a consideration of efficiency to enhance the understanding in a short time period. The approach for achieving the efficiency was i) application of more video, ii) smooth access to internet, iii) reducing data for data analysis, and iv) provision of hint for practical exercise. As a result, all items were rated between "Satisfied" and "Very Satisfied" in the Spring 2018.

Table 4.15 Course Evaluation for Asset Management in Fall 2017

| Sr. No | How satisfied were you with: | Average* on Fall 2017 |
|--------|---|-----------------------|
| 1 | Difficulty Level of Training content | 2.6 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 2.8 |
| 3 | Relevance of On-Site Training Activities | 3.1 |
| 4 | Overall Presentation Quality of Trainer | 3.0 |
| 5 | Trainer's Expertise on Topics and Topic Delivery Skills | 3.3 |
| 6 | Time & Length of Training | 1.9 |
| 7 | Practical Activities & Exercise at Class Room | 2.6 |
| 8 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc. | 2.8 |
| 9 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.3 |
| 10 | Overall Quality of Training | 2.8 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

Table 4.16 Trainees' Evaluation for Asset Management in Fall 2017

| Sr. No | How satisfied were you with: | Average* on Fall 2017 |
|--------|--|-----------------------|
| 1 | Qualification & Experience | 4.1, 4.2 |
| 2 | Technical Knowledge of the Content | 4.3, 4.4 |
| 3 | Explanation of the Content | 3.9, 4.3 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 3.7, 4.3 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 3.8, 4.3 |
| 6 | Management of on-site Training | 3.6, 4.1 |
| 7 | Time Management | 3.3, 3.7 |
| 8 | Presentation Skills | 4.2, 4.3 |
| 9 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 3.9, 4.2 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

Table 4.17 Evaluation on Course and Trainees for Asset Management in Spring 2018

| Sr. No | Items | Average* on Spring 2018 |
|--------|---|-------------------------|
| 1 | Class Lectures | 3.5, 3.8 |
| 2 | Class Exercise | 3.4, 3.8 |
| 3 | Field activities/exercises during site visit | 3.1, 3.8 |
| 4 | Quality of training materials (PPT slides, handouts, lecture notes, models, SOP formats etc.) | 3.7, 3.8 |
| 5 | Schedule & Length of training | 3.1, 3.3 |
| 6 | Technical knowledge of the trainer | 3.6, 3.9 |
| 7 | Presentation skills of the trainer | 3.6 |
| 8 | Training relevant to your job duties | 3.2, 3.6 |
| 9 | Logistic Arrangement (Class Room, Vehicles, Tea and Lunch etc.) | 3.5, 3.8 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

vi-c) Trainees' evaluation

The passing rates in this course were 57% in Fall 2017 and 87% in Spring 2018 as presented in Table 4.3 and Table 4.4, respectively. Annex 4.46 and Annex 4.47 indicate the details such as name of trainee, and the evaluation criteria of attendance and assignment. The participants who failed were 6 in the Fall 2017 and 2 in the Spring 2018. The reason of the fails was low marks in the assignment.

vi-d) Suggestion to Training after this Project

It was observed that there were difficulties in data analysis by Excel and mapping by GIS. If there are basic courses for Excel and GIS, it could contribute to the efficient operation of the exercise. In addition, these basic courses could be offered more than twice a year due to the preference of the small class.

vii) Business Planning

vii-a) Evaluation for Course and Trainers

For the training in Fall 2017, "Form A" and "Form B" of Annex 3.39 were applied for the evaluation of the course and the trainer. In case of the training in Spring 2018, Annex 4.3 was applied for the evaluation of the course and the trainer. Table 4.18 to 4.20 are the summaries of the evaluation presented in Annex 4.48 and 4.49.

As presented in Table 4.18, the evaluation for the course in Fall 2017 was rated as "Satisfied" or better in many items. In case of the trainer's evaluation, the rating was more or less "Very Satisfied". Regardless of the rating, the issue in this course may be the application of the knowledge by WASA. This course includes the preparation of business plan consisting of human resource development, asset replacement, and tariff recovery improvement. However, no application was observed at least until January 2018. The reasons may be explained as follows.

- This activity is not included in the daily activities of WASAs

- The plan may not be actualized due to an issue of budget
- WASAs may not have sufficient number of employees for preparing the plan.

Then the training in Spring 2018 focused on more details in the daily activities of WASAs among the topics of this course. As a result, the tariff recovery was focused because the improvement gives positive impact to WASA directly and quickly. The reasons for the arrear of the tariff are i) less staff at the revenue section, ii) bill delivery due to unclear indication of consumer's address, iii) unwillingness to pay due to dissatisfaction of the services, iv) difficulty to pay due to financial situation of the consumers, etc. Considering such reasons, the training was revised to include the tariff recovery analysis by Excel and the tariff recovery mapping by GIS. Through such activities, the trainees learned an efficient approach such as prioritization and staff allocation to sub division.

Table 4.18 Course Evaluation for Business Planning in Fall 2017

| Sr. No | How satisfied were you with: | Average* on Fall 2017 |
|--------|---|-----------------------|
| 1 | Difficulty Level of Training content | 2.9 |
| 2 | Quality of Training Material (PPT Slides, Handouts, Lecture Notes Etc.) | 3.6 |
| 3 | Overall Presentation Quality of Trainer | 3.7 |
| 4 | Trainer's Expertise on Topics and Topic Delivery Skills | 3.8 |
| 5 | Time & Length of Training | 2.8 |
| 6 | Practical Activities & Exercise at Class Room | 3.1 |
| 7 | Difficulty Level of Assessment and Evaluation (Assignment, Exercises, Project, Action Plan etc. | 2.8 |
| 8 | Logistic Arrangement Such As (Class Room, Vehicles, Tea and Lunch etc.) | 3.3 |
| 9 | Overall Quality of Training | 3.4 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

Table 4.19 Trainer's Evaluation for Business Planning in Fall 2017

| Sr. No | Items | Average* on Fall 2017 |
|--------|---|-----------------------|
| 1 | Qualification & Experience | 3.8-4.4 |
| 2 | Technical Knowledge of the Content | 4.0-4.6 |
| 3 | Explanation of the Content | 3.9-4.4 |
| 4 | Demonstration & Professional Capability of Handling Equipment | 3.9-4.5 |
| 5 | Use of different Content Delivery Techniques (Group Discussion & Activities and exercises) | 4.0-4.5 |
| 6 | Time Management | 4.1-4.3 |
| 7 | Presentation Skills | 3.9-4.7 |
| 8 | Quality of Learning Materials (PPT Slides, Handouts, Lecture Notes) | 4.1-4.4 |

Note: Scales of the point are "1" for "Below Average", "2" for "Average", "3" for "Good", "4" for "Very Good", "5" for "Excellent". The scale is calculated as average of answers.

Table 4.20 Evaluation on Course and Trainers for Business Planning in Spring 2018

| Sr. No | How satisfied were you with: | Average* on Spring 2018 |
|--------|---|-------------------------|
| 1 | Class Lectures | 2.9-3.5 |
| 2 | Class Exercise | 3.2-3.7 |
| 3 | Quality of training materials (PPT slides, handouts, lecture notes, models, SOP formats etc.) | 3.2-3.5 |
| 4 | Schedule & Length of training | 2.6-3.3 |
| 5 | Technical knowledge of the trainer | 3.2-3.7 |
| 6 | Presentation skills of the trainer | 3.2-3.6 |
| 7 | Training relevant to your job duties | 2.8-3.2 |
| 8 | Logistic Arrangement (Class Room, Vehicles, Tea and Lunch etc.) | 3.1-3.2 |

Note: Scales of the point are "1" for "Not Satisfied", "2" for "Somewhat Satisfied", "3" for "Satisfied", "4" for "Very Satisfied". The scale is calculated as average of answers.

vii-b) Trainees' evaluation

The passing rates in this course were 88% in Fall 2017 and 86% in Spring 2018 as presented in Table 4.3 and Table 4.4, respectively. Annex 4.48 and 4.49 indicate the details such as name of trainee, and the evaluation criteria of attendance and assignment. The participants who failed were 2 in the Fall 2017 and the Spring 2018. The reason of the failing was mainly less marks in the assignment and the presentation.

vii-c) Suggestion to Training after this Project

It was observed that there were difficulties in data analysis by Excel and mapping by GIS. If there are basic courses for Excel and GIS, it could contribute to the efficient operation of the exercise. In addition, these basic courses could be offered more than twice a year due to the preference of the small class.

[Activities in Output 3]

[C-8] Monitoring and technical advice against OJT implemented by trained staff at Al-Jazari Academy

Action Plan and OJT Implementation Procedure of the training courses were prepared. The action plan was more comprehensive plan. On the other hand, OJT Implementation Procedure was to indicate the specific activity with the checking items. Each WASA or participant's utilities prepared the action plan in the training. In case of OJT Implementation Procedure, each course had the same form. The form was subjected to adjustment based on the applicability in each WASA. Table 4.21 presents a list of Action Plan and OJT Implementation Procedure in Annex.

Table 4.21 Action Plan and OJT Implementation Procedure in Annex

| Name of Course | Fall 2017 | | Spring 2018 | |
|---------------------------------------|--------------|------------------------------|-------------|------------------------------|
| | Action Plan | OJT Implementation Procedure | Action Plan | OJT Implementation Procedure |
| O&M of Tube Well and Pump Facility | not prepared | Annex 4.56 | Annex 4.58 | Annex 4.56 |
| Leak Detection | Annex 4.50 | Annex 3.58 | Annex 4.59 | Annex 3.58 |
| O&M of Sewer and Storm Water Drainage | Annex 4.51 | not prepared | Annex 4.60 | Annex 4.65 |
| O&M of Electrical Equipment | Annex 4.52 | Annex 4.57 | Annex 4.61 | Annex 4.66 |
| O&M of Mechanical Equipment | Annex 4.53 | Annex 3.62 | Annex 4.62 | Annex 4.67 |
| Asset Management | Annex 4.54 | not planned for preparation | Annex 4.63 | not planned for preparation |
| Business Plan | Annex 4.55 | | Annex 4.64 | |

The academy provides the trainings at the academy and OJTs at the field of WASAs. Then, next step is to implement own activities by WASAs. The following is the process from the trainings at the academy to the implementation of own activities by WASAs.

- 1) To obtain knowledge and techniques through the training at the academy
- 2) To implement OJT at the field of WASAs among WASA staff, the faculties of the academy, JICA Experts, and the coordinators employed by JET
- 3) To realize what to do for improvement by WASA staff
- 4) To formulate the OJT implementation team (formal/informal) by WASA staff
- 5) To implement the activities for an improvement only by WASA staff at the sub division office of the team
- 6) To obtain the appropriate technique for an improvement by the repeated activity
- 7) To apply the techniques in daily activities at the sub division office of the team
- 8) To implement OJT by the OJT implementation team at the other division/sub division offices
- 9) To obtain the appropriate technique for an improvement by the repeated activity
- 10) To apply the techniques in daily activities at the implemented offices of WASAs
- 11) To implement OJT by the OJT implementation team at all offices of WASAs
- 12) To obtain the appropriate technique for an improvement by the repeated activities
- 13) To apply the techniques in daily activities at all offices of WASAs

Note that it may skip to 8) after 4). It depends on a type of the activities, and the organizational structure of WASAs.

In [C-8], Item 2) listed above is described. The own activities by WASA without the faculties of the academy, JICA Experts, and the coordinators employed by JET are described in "6 Project Evaluation based on PDM" > "6.2 Achievement of Project Purpose" > "Item 2".

(1) O&M of Tube Well and Pump Facility

OJT activity was implemented by checking the following items, and discussing the improvement.

- To monitor availability of updated maps at WASA Sub Division
- To check chlorine solutions at tube well and reservoir
- To monitor chlorine dosing at tube well
- To monitor chlorinator at tube well chamber in optimum working order
- To check dosing schedule as per quality of supplied water
- To monitor status of bulk flow meter at source & domestic meter at consumer end
- To record and report discharge at tube well
- To monitor measurement of pressure at tube well
- To check water quality
- To check residual chlorine at various locations of water distribution system

The OJT activities were carried out by the faculties of the academy, Mr. Zia Mustafa, Mr. Rizwan Mushtaq, and Mr. Muhammad Faisal on the date indicated in Table 4.22.

Table 4.22 OJT Activities in O&M of Tube Well and Pump Facility

| WASA | Date of OJT Activities |
|------------|---------------------------------|
| Lahore | Oct 30, 2017, March 12-14, 2018 |
| Faisalabad | Nov 2, 2017 |
| Multan | Oct 31 - Nov 1, 2017 |
| Gujranwala | Nov 6 - 7, 2017 |
| Rawalpindi | Nov 8 - 9, 2017 |

The result of each site survey is attached in Annex 4.68. The following is the summary of findings through the site visit.

- No Residual Chlorine Measuring Kits were available for tube well chamber and consumer end.
- There was no dosing schedule of chlorine at 5 WASAs.
- Chlorine is fed through containers directly into tube well. No chlorinators were available at most of the tube wells.

These issues remain the same as before. However, some improvement was observed as mentioned in "6.2 Achievement of Project Purpose". For example, Multan WASA installed new chlorinators or repaired malfunctioned chlorinators. In case of Rawalpindi WASA, scales attached to chlorinators were cleaned up for maintenance purpose. In addition, chlorine ratio was adjusted according to the training at the academy.

(2) Leak Detection

The faculties (Mr. Zia Mustafa, Mr. Rizwan Jabbar, Mr. Muhammad Faisal) visited WASAs as presented in Table 4.23, and implemented OJT how to install and operate the equipment such as ultrasonic flow meter, pressure recorder, non-metal pipe locator, metal pipe locator, acoustic leak

detector, acoustic bar, metal detector, and distance measure. In March 2018, Mr. Takeshi Yajima, JICA Expert, joined the visit to Lahore WASA and Multan WASA together with the faculties. New activities were added in OJT in March 2018 as follows:

- To listen to the sound transmitting through the service pipe by acoustic bar when a motor is ON and OFF (at Lahore WASA and Faisalabad WASA)
- To listen to the sound transmitting through the service pipe and the house connection pipe by acoustic bar at various distances from the tap in condition of various openings of the tap (at Multan WASA)
- To listen to the sound transmitting through the distribution pipe by acoustic bar during leaking (at Multan WASA)
- To recommend an improvement of assembling the house connection pipes (at 5 WASAs)

Table 4.23 OJT Activities in Leak Detection

| WASA | Date of visit |
|------------|---------------------------------------|
| Lahore | Oct 30, 2017, Mar 27, 2018 |
| Faisalabad | Nov 2, 2017, Apr 2-4, 2018 |
| Multan | Oct 31 - Nov 1, 2017, Mar 28-31, 2018 |
| Gujranwala | Nov 6 - 7, 2017, May 3, 2018 |
| Rawalpindi | Nov 8 - 9, 2017, Apr 5-7, 2018 |

(3) O&M of Sewer and Storm Water Drainage

Before October 2017, OJT activities were encompassing safety exercise during real-time O&M jobs. OJTs onward October 2017 were focused on more technical activities as enlisted below:

- 1) Cardiopulmonary Resuscitation (hereinafter referred to as "CPR") exercise by using manikin
- 2) Gas monitoring in manhole by using multi gas meter
- 3) Ensuring safe working zone on and along road (where O&M job under way)
- 4) Sludge volume estimation in storm water drains and optimum use of excavators and dumpers
- 5) Detection of buried manhole by metal locator
- 6) Strengthening of wearing hand gloves

OJTs at WASAs were carried out by Mr. Muhammad Irfan and Mr. Fahad Hussain, faculties of the Academy, Mr. Ryuta Kudo or Dr. Nobuyuki Sato, JICA Experts, and Mr. Rizwan Qazi, a coordinator of JICA Expert Team. Table 4.24 presents the dates of OJTs. As mentioned above, one of the activities among all OJTs was 'to detect buried manhole covers', so nearly at every OJT occasion, WASA staff successfully found buried manholes by using metal locator, comfortably and in a short time.

Table 4.24 Visit to WASAs for O&M of Sewer and Storm Water Drainage

| WASA | Date | Participants from WASA | Date | Participants from WASA |
|------------|-----------------|---|-----------------|--|
| Lahore | Nov 8, 2017 | Ms. Zainab Abbas | Apr 19, 2018 | Mr. Nabil Ahmed |
| Faisalabad | Oct 20-21, 2017 | Mr. Faizan Shakoor Mr. Mohsin Ali Asghar | Apr 10, 2018 | Mr. Irfan-ul-Haq Mr. Syed Zulqarnain Hayder |
| Gujranwala | Oct 23, 2017 | Mr. Jahanzeb Irshad Mr. Muhammad Khurram | Apr 6, 2018 | Mr. Shakeel Ahmad Mr. Muhammad Abdul Rehman |
| Multan | Oct 16-17, 2017 | Mr. Muhammad Shakeel Ahmed Mr. Malik Muhammad Arif Abbas | Apr 23-24, 2018 | Mr. Muhammad Qasim Mr. Muhammad Fiaz |
| Rawalpindi | Oct 19-20, 2017 | Mr. Afzal Baloch | Apr 16-17, 2018 | Mr. Muhammad Ali Gulraiz Mr. Adil Afzal |

(4) O&M of Electrical Equipment

The site visits were carried out for 5 WASAs by Mr. Jawad Shahid, a faculty of the academy as shown in Table 4.25. JICA Expert also carried out for a part of the activities. Main activities were i) to calculate electrical load and measure power factor, ii) to inspect electrical panels, iii) to inspect device performance, iv) to inspect performance of generators, v) energy efficiency analysis, etc..

Table 4.25 Visit to WASAs for O&M of Electrical Equipment

| WASA | Date | Participants from WASA |
|------------|--|------------------------|
| Lahore | Dec 20, 2017 Jan 1-3, 2018 | 7 |
| Faisalabad | Nov 15-18, 2017 Jan 8-11, 2018 | 6 |
| Gujranwala | Jan 16, 2018 | 1 |
| Multan | Nov 22-23, 2017 Feb 8-9, 2018 | 5 |
| Rawalpindi | Jan 12-13, 2018 Feb 28- Mar 1, 2018 | 2 |

(5) O&M of Mechanical Equipment

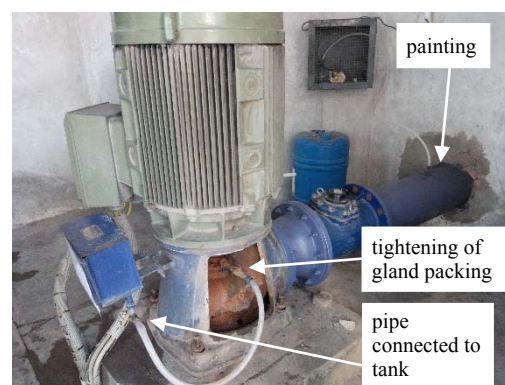
The site visits were carried out for 5 WASAs by faculties of the academy (Mr. Mubashar Ahmed Cheema, Mr. Ihsan-ul-haque Javed, Mr. Tanveer Shehzad) and JICA Expert as shown in Table 4.26. The activity was carried out at tube well and storage as shown in Picture 4.1 to 4.6.

Table 4.26 Visit to WASAs for O&M of Mechanical Equipment

| WASA | Date | Participants from WASA |
|------------|----------------------------|------------------------|
| Lahore | Mar 19, Apr 2, 4, 24, 2018 | 5 |
| Multan | Nov 27-29, 2017 | 10 |
| Faisalabad | Jan 9-11, 2018 | 12 |
| Gujranwala | Jan 15-16, 2018 | 3 |
| Rawalpindi | Feb 26 - Mar 2, 2018 | 8 |



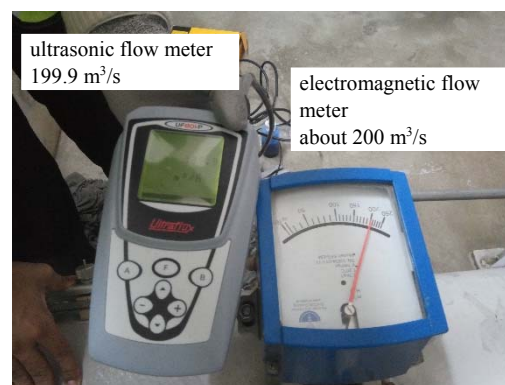
Picture 4.1 Before OJT



Picture 4.2 After OJT



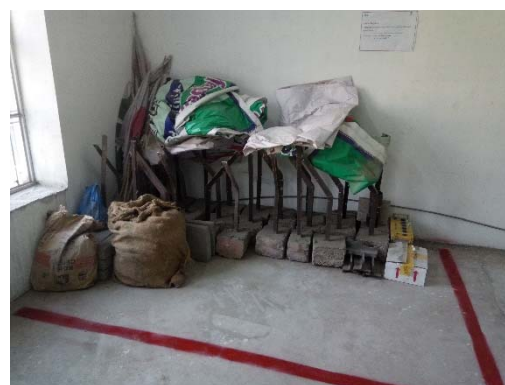
Picture 4.3 Checking impeller of flow meter



Picture 4.4 Comparison of ultrasonic flow meter and electromagnetic flow meter



Picture 4.5 Checking chlorine dosage equipment



Picture 4.6 Disposal items placed at designated place after 5S activity

In addition, HSE activity was carried out together with above activity related to the mechanical equipment. The following is the detail of HSE activity at WASAs.

- Introduction of personal protective equipment (PPE)
- Job safety analysis (JSA) and hazard identification
- Firefighting
- Low voltage rescue kit
- Cardiopulmonary Resuscitation (CPR)
- First aid box and record keeping
- Accident or incident reporting



Briefing on First Aid Box and component



Introduction and awareness session of HSE



Demonstration of CPR



Demonstration of fire extinguisher

Picture 4.7 HSE Activities at Field of WASA

(6) Asset Management

Zain Hassan and Ismaeel Azeem Khan, JICA coordinators, visited to Gujranwala WASA from Feb 19 to 23, 2018 for asset evaluation activities. This visit aimed on implementing a survey of the basic asset condition at tube well together with WASA staff. The survey evaluated the condition of a pump, a motor, electrical cable insulation, and the others.

5 Dispatch of JICA Experts, Training in Japan, and Equipment Procured

5.1 Dispatch of JICA Experts

Dispatch of JICA Experts in the first, the second, and the third project year is summarized in Table 5.1. The detail is presented in Fig. 5.1 to 5.3.

Table 5.1 Summary on Dispatch of JICA Experts

| Project Year | Period | Activities in Pakistan (Men-Month) |
|--------------|----------------------|------------------------------------|
| 1 | Aug 2015 - June 2016 | 36.17 |
| 2 | Aug 2016 - June 2017 | 27.86 |
| 3 | Aug 2017 - June 2018 | 24.47 |
| Total | | 88.50 |

| Field | Name | 1st Year | | | | | | | | | | | | Total (Men- Month) |
|---|--------------------|----------|---------------------------------|---|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|--------------------------------|--------------------------------|--------------------------------|---|--------------------------|
| | | 2015 | | | | | | 2016 | | | | | | |
| | | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | |
| Chief advisor/training management / O&M of water sector | Nobuyuki Sato | | <div><div></div></div> (72) | | | <div><div></div></div> (4) | <div><div></div></div> (62) | | | <div><div></div></div> (55) | | <div><div></div></div> (61) | | 8.47 |
| Leak detection | Chiaki Suzuki | | <div><div></div></div> (60) | | <div><div></div></div> (55) | | | | <div><div></div></div> (105) | | | | | 7.33 |
| O&M of Water supply facilities | Takuji Okubo | | <div><div></div></div> (60) | | | | | <div><div></div></div> (50) | | | <div><div></div></div> (30) | | | 4.67 |
| O&M of Mechanical equipment | Ryuta Kudo | | | | | | | <div><div></div></div> (45) | | | <div><div></div></div> (30) | | | 2.50 |
| O&M of electrical equipment | Akira Hasebe | | | | | | | | <div><div></div></div> (21) | | <div><div></div></div> (21) | | | 1.40 |
| O&M of Drainage and Sewerage | Yusuke Ando | | <div><div></div></div> (30)* | | <div><div></div></div> (3) | <div><div></div></div> (14) | <div><div></div></div> (27) | <div><div></div></div> (6) | | <div><div></div></div> (85) | | | | 5.50 |
| Water utilities business management including asset management and planning | Yasuyuki Kuroda | | <div><div></div></div> (50) | | | | | <div><div></div></div> (44) | | | <div><div></div></div> (35) | | | 4.30 |
| Training skill | Ken Yokoyama | | | | | | | | | <div><div></div></div> (30) | | | | 1.00 |
| Curriculum development and assessment | Naoki Matsuo | | | | | <div><div></div></div> (30) | | | | | | | | 1.00 |
| | | Total | | | | | | | | | | | | 36.17 |

Fig. 5.1 Dispatch of JICA Experts in First Project Year

| Field | Name | 2nd Year | | | | | | | | | | | Total (Men- Month) |
|---|--------------------|--|--|--|------------------------|--|------------------------|--|--|---|------------------------|------------------------|--------------------------|
| | | 2016 | | | | | 2017 | | | | | | |
| | | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | |
| Chief advisor/training management / O&M of water sector | Nobuyuki Sato | <div><div></div></div> <div>(61)</div> | <div><div></div></div> <div>(86)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> <div>(49)</div> | <div><div></div></div> | <div><div></div></div> <div>(71)</div> | <div><div></div></div> | | 8.90 |
| Leak detection | Chiaki Suzuki | | <div><div></div></div> <div>(33)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> <div>(43)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | 2.53 |
| O&M of water supply facilities | Takuji Okubo | | | <div><div></div></div> <div>(30)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> <div>(24)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | 1.80 |
| O&M of mechanical equipment | Ryuta Kudo | | | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> <div>(53)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> <div>(50)</div> | <div><div></div></div> | <div><div></div></div> | 3.43 |
| O&M of electrical equipment | Akira Hasebe | | | <div><div></div></div> <div>(45)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> <div>(39)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | 2.80 |
| O&M of drainage and sewerage | Yusuke Ando | | | <div><div></div></div> <div>(42)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> <div>(22)</div> | <div><div></div></div> | <div><div></div></div> <div>(12, 6, 2, 6)</div> | <div><div></div></div> | <div><div></div></div> | 3.00 |
| Water utilities business management including asset management and planning | Yasuyuki Kuroda | | | <div><div></div></div> <div>(45)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> <div>(50)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | 3.17 |
| Training skill / Curriculum development and assessment | Ken Yokoyama | <div><div></div></div> <div>(19)</div> | <div><div></div></div> | <div><div></div></div> <div>(20)</div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> | <div><div></div></div> <div>(28)</div> | <div><div></div></div> | <div><div></div></div> | 2.23 |
| | | Total | | | | | | | | | | | 27.86 |

Fig. 5.2 Dispatch of JICA Experts in Second Project Year

| Field | Name | 3rd Year | | | | | | | | | | | | Total (Men- Month) |
|---|--------------------|---------------|---------------|-------------------|-------------|---------------|---------------|-------------|-------------|---------------|---|---|------|--------------------------|
| | | 2017 | | | | | | 2018 | | | | | | |
| | | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | | |
| Chief advisor/training management / O&M of water sector | Nobuyuki Sato | ■■■■■ (55) | | ■■■■■■■■■ (85) | | | ■■■■■ (51) | | | ■■■■■ (57) | | | 8.27 | |
| Leak detection | Chiaki Suzuki | | | ■■■ (45) | | | | | | | | | 1.50 | |
| | Takeshi Yajima | | | | | | | | | ■■■■■ (45) | | | 1.50 | |
| O&M of water supply facilities | Takuji Okubo | | | | ■■■ (30) | | | | ■■■ (30) | | | | 2.00 | |
| O&M of mechanical equipment / O&M of drainage and sewerage | Ryuta Kudo | | ■■■■■ (44) | | | ■ (10) | ■■■ (36) | | | ■■■■■ (45) | | | 4.50 | |
| O&M of electrical equipment | Takeo Maruyama | | ■■■ (24) | | | ■■■■■ (41) | | | | ■■■■■ (40) | | | 3.50 | |
| Water utilities business management including asset management and planning | Yasuyuki Kuroda | | | | ■■■ (35) | | | ■■■ (36) | | | | | 2.37 | |
| Training skill / Curriculum development and assessment | Ken Yokoyama | ■ (12) | | | | | | | | ■ (13) | | | 0.83 | |
| | | Total | | | | | | | | | | | | 24.47 |

Fig. 5.3 Dispatch of JICA Experts in Third Project Year

5.2 Training in Japan

The training in Japan was held three times. The details are described in "2. Activities in First Project Year">"[A-3]", "3. Activities in Second Project Year">"[B-2]", and "4. Activities in Third Project Year">"[C-1]". The number of trainees is summarized in Table 5.2.

Table 5.2 Training in Japan

| Period of Training in Japan | Number of Trainees | List of Trainees |
|-----------------------------|--------------------|------------------|
| April 10 - 16, 2016 | 14 | Annex 2.4 |
| Jan 15-21, 2017 | 19 | Annex 3.1 |
| Jan 21-27, 2018 | 19 | Annex 4.1 |
| Total | 52 | |

5.3 Equipment Procured

Table 5.3 presents the equipment procured. The ownership of the equipment was transferred to Pakistani side.

Table 5.3 Equipment Procured

| No | Item | Quantity | Letter of Transferring Ownership |
|----|--|----------|----------------------------------|
| 1 | Portable Ultra- sonic Flow Meter Model: UF801P (with SE-1515 Probe) | 2 | Annex 2.3 |
| 2 | Pressure Gauge Model: FJN-501A | 2 | |
| 3 | Metal Locator Model: M130 | 2 | |
| 4 | Non-metal Pipe Locator Model: D305 | 2 | |
| 5 | Acoustic Leak Detector Model: AQUASCOPE3 (AS3P) | 2 | |
| 6 | Metal pipe Locator Model: 501 | 2 | |
| 7 | Pressure Recorder Model: FJN-501A | 1 | |
| 8 | Multi gas (CO, H2S, CH4, O2) meter Model: GX-8000 (Type B) | 2 | |
| 9 | Acoustic bar Model: LSP-1.0 (1m) | 2 | |
| 10 | Distance meter Model: EN-R 1000 | 8 | |
| 11 | Laptop PC Model: HP Probook 450 | 6 | |
| 12 | Desktop PC Model: Dell OptiPlex 9020 | 1 | |
| 13 | Power Analyzer Model: KEW6315 | 6 | Annex 5.1 |
| 14 | Computer (Laptop) Specification: Intel Core i7 | 10 | |
| 15 | Computer (Laptop) Specification: Intel Core i5 | 10 | |
| 16 | Water Level Meter Model: WL100, Type 2B | 7 | Annex 5.2 |

In addition, the electrical testing tools shown in Table 5.4 were purchased and used by the academy and WASAs.

Table 5.4 Electrical Testing Tools

| No | Item | Quantity |
|----|--|----------|
| 1 | Digital Clamp Meter Manufacturer: Kyoritsu | 6 |
| 2 | Insulation - Continuity Tester Manufacturer: Kyoritsu Model: 3005A | 6 |
| 3 | Power Analyzer Clamp Type Model: UT243 | 6 |
| 4 | Earth Tester Manufacturer: Kyoritsu Model: 4105A | 6 |

6 Project Evaluation based on PDM

This project evaluation is described based on PDM focusing on i) achievement of Output, ii) achievement of Project Purpose, and iii) suggestion for achieving Overall Goal. The original PDM was revised mainly by a change of the name for academy from "Punjab WATSAN Academy" to "Al-Jazari Academy". This revision was agreed by JCC on Sep 22, 2015 (see Annex 8.1). Table 6.1 presents a list of PDMs.

Table 6.1 List of PDMs

| Version of PDM | Reference |
|----------------|-----------|
| Version 0 | Annex 6.1 |
| Version 1 | Annex 1.3 |

6.1 Achievement of Output

Output 1: Training system of Al-Jazari Academy is established.

- 1-1 Training curriculum and training material/manual are developed for tube well and pump facility, leakage detection, sewer and storm water drainage, disposal station, and asset management.

Achievement: 100%

Explanation:

The first training started from Fall 2016. Training curriculum and training material/manual are described in Annex 3.37, and Annex 3.19 - 3.24, respectively. The detail is described in "3. Activities in Second Project Year (August 2016 - June 2017)" > "[B-6]" > "(7) Revision of training materials and curriculum".

- 1-2 Evaluation mechanism for training courses and Al-Jazari Academy staff is established.

Achievement: 100%

Explanation:

Initially, the evaluation for the courses and the trainers is made based on Questionnaire "Form A" and "Form B", respectively. "Form A" and "Form B" are presented in Annex 3.39. However, similar questions were listed in "Form A" and "Form B". In addition, the number of questions was too many. More effective comments might have been written if the number of questions was reduced. The faculties of the academy and JICA Experts discussed the revision of the questionnaire. As a result, "Form A" and "Form B" were merged together for reducing the number of questions as attached in Annex 4.3. The detail is described in "3. Activities in Second Project Year (August 2016 - June 2017)" > "[B-7]", and "4. Activities in Third Project Year (August 2017 - June 2018)" > "[C-7]".

- 1-3 Training curriculum and training material/manual are revised regularly.

Achievement: 100%

Explanation:

The training curriculums and training materials were revised. Table 6.2 and 6.3 present a list of the training curriculums and the training materials, respectively. The detail is described in "3. Activities in Second Project Year (August 2016 - June 2017)" > "[B-6]" > "(7) Revision of training materials and curriculum", and "4. Activities in Third Project Year (August 2017 - June 2018)" > "[C-6]", "[C-7]".

Table 6.2 List of Curriculums

| Training | Reference |
|-------------|------------|
| Fall 2016 | Annex 3.37 |
| Spring 2017 | Annex 3.38 |
| Fall 2017 | Annex 4.34 |
| Spring 2018 | Annex 4.35 |

Table 6.3 List of Training Materials

| Training Course | Fall 2016 | Spring 2017 | Fall 2017 | Spring 2018 |
|---------------------------------------|----------------------------|------------------------------|------------|-------------|
| O&M of Tube Well and Pump Facility | Annex 3.19 | Annex 3.31 | Annex 4.13 | Annex 4.27 |
| Leak Detection | Annex 3.20 | Annex 3.32 | Annex 4.14 | Annex 4.28 |
| O&M of Sewer and Storm Water Drainage | Annex 3.21 | Annex 3.33 | Annex 4.15 | Annex 4.29 |
| O&M of Electrical Equipment | Annex 3.22 | Annex 3.34 | Annex 4.16 | Annex 4.30 |
| O&M of Mechanical Equipment | Annex 3.23 | Annex 3.35 | Annex 4.17 | Annex 4.31 |
| Asset Management | Annex 3.24 | not scheduled in Spring 2017 | Annex 4.18 | Annex 4.32 |
| Business Planning | not scheduled in Fall 2016 | Annex 3.36 | Annex 4.19 | Annex 4.33 |

1-4 Annual training plan is made every year.

Achievement: 100%

Explanation:

The annual training plans for Second and Third Project Year are presented in Table 3.8 and 4.1, respectively.

Output 2: The faculties at Al-Jazari Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management.

2-1 Regular training courses are conducted by Al-Jazari Academy staff.

Achievement: 100%

Explanation:

The regular training courses were conducted by Al-Jazari Staff according to Table 3.8 and 4.1.

- 2-2 More than 80 % of trainees participating in the training courses pass the level check test.

Achievement: 100%

Explanation:

Table 6.4 is a summary of the results of pass/fail presented in Table 3.9, 3.10, 4.3, and 4.4. During the first two periods, the passing rates were lower than 80%. Then the rates increased. As a result, in the entire project period, an average of the passing rate was calculated as 85%.

Table 6.4 Passing Rate of Training

| | Total | Pass | Fail | Passing Rate |
|-------------|-------|------|------|--------------|
| Fall 2016 | 107 | 79 | 28 | 74% |
| Spring 2017 | 77 | 58 | 19 | 75% |
| Fall 2017 | 112 | 101 | 11 | 90% |
| Spring 2018 | 120 | 114 | 6 | 95% |
| Total | 416 | 352 | 64 | 85% |

Output 3: OJT is implemented by trainees of WASAs trained at Al-Jazari Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management.

- 3-1 The following OJT activities are implemented with an application of the obtained knowledge and techniques at Al-Jazari Academy. i) O&M of tube well and pump facility, ii) leakage detection, iii) O&M of sewer and storm water drainage, iv) O&M of disposal station, v) asset management"

Achievement: 85%

Explanation:

All trainees, who participated the training at the academy, did not implement OJT at the field of WASA or their offices when they went back to their offices. However, OJT activities were extensively performed among WASA staff, the faculties of the academy, JICA Experts, and coordinators employed by JET. The details are described in "3. Activities in Second Project Year (August 2016 - June 2017)" > "[B-9]" and "4. Activities in Third Project Year (August 2017 - June 2018)" > "[C-8]".

6.2 Achievement of Project Purpose

Project Purpose has two items. Each item is described as follows.

- Item 1 Training courses are conducted as planned

Achievement: 100%

Explanation:

Training courses were conducted from October 2016 to April 2018 as planned (see Table 3.8, 4.1).

Item 2 Performance indicators related to management and O&M are improved.

Achievement: 80%

Explanation:

JCC defined "Performance indicators" as "whether WASA applies activities trained through the training at Al-Jazari Academy or not" (see Annex 8.5). There were some limitations for the own activities, especially Asset Management and Business Planning. In a major parts of these courses, data analyses by computer were included. However, only a few computers are available at WASAs. In addition, many topics in these courses are applicable to WASA's activities less frequently as compared to the other courses. Having such circumstances, it has been observed extensively for WASAs' own activities trained through the training at Al-Jazari Academy without presence of the faculties of the academy, JICA experts, and coordinators employed by JICA Expert Team as follows.

(1) Lahore WASA

1) O&M of Tube Well and Pump Facility

none

2) Leak Detection

a) The metal detector, procured by this project, was used extensively in order to detect buried manholes by Leakage Detection Cell of Lahore WASA. Table 6.5 shows the numbers of buried manhole covers detected by Leak Detection Cell of Lahore WASA.

Table 6.5 Number of Buried Manhole Covers Detected by Lahore WASA

| Area | Period | Numbers of buried manhole covers detected | Reference |
|----------------|-----------------------|---|-----------|
| Gulberg | Jan 8 - 31, 2018 | 54 | Annex 6.2 |
| Gulshan e Ravi | Nov 6, 2017 | 12 | |
| Anar Kali | Nov 31 – Dec 10, 2017 | 8 (valve chamber: 3) | |
| Islampura | Nov 22 - Dec 10, 2017 | 7 | |
| Ravi Road | Apr 25 - 30, 2017 | 11 | |
| Mozang | Dec 18 – 31, 2017 | 32 | |
| Ichhra | Feb 20 - Apr 21, 2018 | 61 | |

Picture 6.1 presents the activity of detecting buried manhole covers.



Detection activity



Digging at detecting place



Reaching buried manhole cover



Setting of manhole cover on ground level

Picture 6.1 Detection of Buried Manhole Cover and Repair

b) Measurement of flow rate by ultrasonic flow meter

The measurement of flow rate at Lahore WASA was mainly implemented by Energy Audit Team in Electricity Cell. The team has used the ultrasonic flow meter, procured by this project, since February 2018 according to Ms. Anum Javed, SDO, Electricity Cell.

3) O&M of Sewer and Storm Water Drainage

Buried manhole covers were detected as mentioned in "2) Leak Detection".

4) O&M of Mechanical Equipment

The work place standardization and process optimization (5S) has been applied to the storage of WASA Drainage Directorate Central Iqbal Town Sub Division according to Mr. Saad Siddiqui, SDO E&M. Before the items and equipment were not arrayed. As a result, the necessary items and/or equipment were not found easily. After the activities, it has been much easier to find the necessary items and/or equipment. Picture 6.2 shows the progress of the activity.



one month after some work as of Nov 23, 2017



completion of 5S as of Mar 12, 2018

Picture 6.2 5S activity at storage of WASA Drainage Directorate
Central Iqbal Town Sub Division

Maintenance activities of chlorinator and replacement of gland packing have been also carried out at tube wells in Ichhra Sub Division according to i) Mr. Aamir Tufail, Sub Engineer (Ichhra Sub Division), ii) Mr. Muhammad Imran Shafique, JPO (Karmabad Rehmanpura), and iii) Mr. Rehan Quareshi, JPO (Bukhari Market Rehamnpura).

5) O&M of Electrical Equipment

a) Over / under voltage relay settings, over current relay settings and star - delta timer settings were added and have been applied to the activities of Energy Audit Team led by Ms. Anum Javed, Assistant Director in Electricity Cell (see Annex 6.3).

b) The basic measurement of electrical equipment was implemented such as preventive maintenance record and device inspection at various sites (see Annex 6.4).

6) Asset Management

none

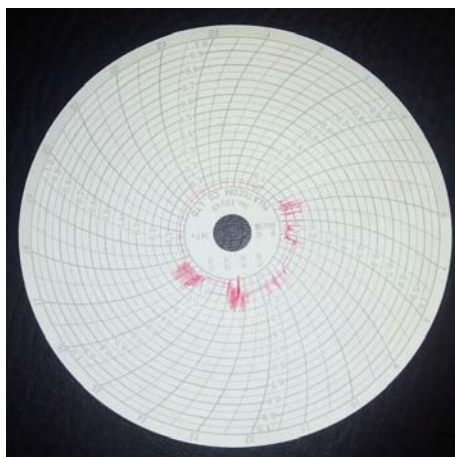
7) Business Planning

none

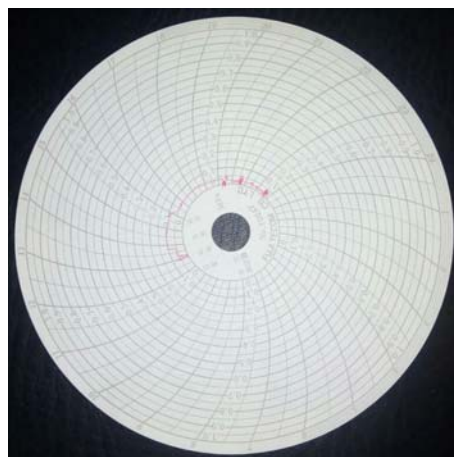
(2) Faisalabad WASA

1) O&M of Tube Well and Pump Facility

The pressure recorder, procured by this project, has been used at tube wells of Jhal Water Works, Samanabad and Sarfaraz Colony by Mr. Atiq ur Rehman, Sub Engineer and his team.



24-hour monitor at Jhal water works on Apr 25, 2017



12-hour monitor at Samanabad Colony on Apr 29, 2017

Picture 6.3 Continuous Record of Water Pressure by Water Pressure Recorder

2) Leak Detection:

- a) Pressure recorder was used. Refer to "1) Tube Well".
- b) The ultrasonic flow meter, procured by this project, is regularly used in Sarfaraz colony by Mr. Atiq ur Rehman, Sub Engineer and his team to measure the flow rates on distribution of water supply pipe lines (pipe diameter: 3, 4, 6, and 8 inches, pipe material: AC, CI).
- c) The acoustic leak detector and the acoustic bar are regularly used in Sarfaraz colony in order to investigate leakage at distribution and service pipes, and house connections of water supply by Mr. Atiq ur Rehman, Sub Engineer and his team.
- d) Non-metal and metal pipe locator have been used in Sarfaraz colony (pilot area) by Mr. Atiq ur Rehman, Sub Engineer and his team.

3) O&M of Sewer and Storm Water Drainage

Mr. Irfan ul Haq, Assistant Director O & M learned an importance of HSE through the training at the academy. One of them is to monitor gases during work inside manhole. Mr. Irfan ul Haq has enforced to wear gas mask to sewer man while entering manholes of lateral and trunk sewers. In order to ensure the application of HSE, he stays at site of the desilting activity by his team. In addition, he proposed an importance of a sign board at the work site. This proposal was accepted. As a result, Faisalabad WASA ordered 8 sign boards, indicating "Sorry for inconvenience. WASA work in progress" (see Picture 6.4). These boards have been placed on both ends of the work site.



Picture 6.4 Sign Board for Work Site

4) O&M of Mechanical Equipment

a) Preventive maintenance works such as i) gland packing replacement of valves and pumps, ii) greasing to bearing of motor, and iii) open/close of ball valves have started since February 2018 by i) Mr. Zafar Sapra, Assistant Director Water Resource, and ii) Mr. Farooq Ahmad, Sub Engineer Water Resource at tube well No. 18 - 21 of Jhal Branch Canal according to Mr. Muhammad Noman Noor, Assistant Director (see Annex 6.5).

b) The data for preventive maintenance works have been recorded by i) Mr. Zafar Sapra, Assistant Director Water Resource, and ii) Mr. Farooq Ahmad, Sub Engineer Water Resource at tube well No. 19-21 of Jhal Branch Canal according to Mr. Muhammad Noman Noor, Assistant Director (see Annex 6.5).

5) O&M of Electrical Equipment

Under the energy audit activities by Electric Cell, flow rates have been measured at tube well by ultrasonic flow meter, procured by this project. In addition, the power consumed at tube wells and disposal stations has been i) measured by the power analyzer, procured by this project, and ii) analyzed by a parameter of the motor efficiency based on the measured data by the power analyzer (see Annex 6.6).

6) Asset Management

none

7) Business Planning

none

(3) Multan WASA

1) O&M of Tube Well and Pump Facility

none

2) Leak Detection

a) Acoustic Leak detector, procured by this project, has been used for the leak detection at service pipes by Mr. Abdus Salam, Deputy Director, Water Supply.

b) The metal locator are used. Refer to "3) O&M of Sewer and Storm Water Drainage".

3) O&M of Sewer and Storm Water Drainage

a) Many buried manhole covers were detected by the metal locator. Multan WASA obtained one metal locator from this project and four from the other project, and has allocated them to each Sewerage Sub Divisional office. The metal locator, procured by this project, is easier to use. Therefore, the metal locator, procured by this project, has been used more frequently than the other metal locators according to Mr. Irfan Ali, Deputy Director, South Zone, and Mr. Muhammad Shakeel Ahmad, Sub Engineer, Hassan Parwana Sub Division.

b) The multi gas meter, procured by this project, has been used for monitoring gases during desilting activity in sewer line and manhole according to Mr. Muhammad Shakeel Ahmad, Sub Engineer.

4) O&M of Mechanical Equipment

a) More than 40 units of new chlorinators were installed at tube wells in Shah Shams Park, Peer Zahir Shah, Waliyatabad, Shah Shams Colony, and the other sites, where no chlorinators were installed or chlorinators were not functional before according to Mr. Abdus Salam, Deputy Director water supply.

b) Malfunctioned chlorinators have been repaired by staff of Water Supply Department since January 2018 according to Mr. Abdus Salam, Deputy Director water supply.



Picture 6.5 Collected Malfunctioned Chlorinators

c) Chlorine dosage has been calculated according to the formula trained at Al Jazari Academy. The following presents the calculation sheet, which Multan WASA applied.

Calculation for Diaphragm pump dosage

Formula

$$C = T \times Q / 60 \times D \times (100/R) \div SW$$

Input values in the yellow cells.

| Item | | Value | Unit | Remarks |
|--|----|-------|--------|--|
| Target | T | 1 | [mg/L] | Input your target(e.g. 1mg/L(1ppm), 3mg/L(3ppm), etc). |
| Total water capacity (approx. pump capacity) | Q | 408 | [m3/h] | Check actual pump flow rate measured by flow meter and input it. |
| NaClO % (Sodium hypochlorite) | R | 18 | % | It's depends on the product. Ask it supplier or related person. |
| Dilution ratio (if required) | D | 1 | | Usually, just use "1". |
| NaClO specific weight (approx.1.2~1.25) | SW | 1.25 | | Basic acknowledge: When NaClO ratio is 12%, 20°C, SW is 1.2. |
| Diaphragm pump dosage | C | 30.2 | mL/min | Calculate automatically. |
| Diaphragm full operation (100%) | | 5 | L/h | It's mentions on the pump. |
| | | 83.4 | mL/min | The unit should be same with "C". |
| Range of diaphragm pump should be adjusted | | 36 | % | If percentage is over 100%, pump should be changed. |

d) Chlorination process at 50-60 tube wells in Shah Shams Park, Peer Zahir Shah, Waliyatabad, Shah Shams Colony, and the other sites has started since March 2017 according to Mr. Abdus Salam, Deputy Director water supply.

e) At Eidgah and Rashidabad tube wells in North Zone, pressure gauges are checked regularly. In addition, gland packings are replaced regularly according to Mr. Abdus Salam, Deputy Director water supply.

5) O&M of Electrical Equipment

The power consumed at tube wells and disposal stations was measured by the power analyzer, procured by this project. In addition, the daily operations of motors were recorded by Mr. Umair Asghar, Assistant Director. Mr. Muhammad Sajid, Assistant Director, has also used power analyzer, insulation tester and clamp meter to solve the issues at sites.

6) Asset Management

none

7) Business Planning

none

(4) Gujranwala WASA

1) O&M of Tube Well and Pump Facility

Mr. Muhammad Tauseef, SDO and his team in Model Town Sub Division used the pressure recorder, procured by this project, in order to record water pressure.

2) Leak Detection

a) Mr. Muhammad Tauseef, SDO and his team in Model Town Sub Division used ultrasonic flow meter for measuring flow rate at tube wells

b) Pressure recorder was used. Refer to "1) O&M of Tube Well and Pump Facility".

3) O&M of Sewer and Storm Water Drainage

Gujranwala WASA found 3 buried manhole covers in Fareed town near upper Chenab canal, and 3 manhole covers on the service road under Layan wala flyover in December 2017 according to Mr. Jahanzeb Chatha, Sub Engineer.

4) O&M of Mechanical Equipment

a) The work place standardization and process optimization (5S) has been applied to the storage for materials and equipment. Before 5S training, all materials and equipment were not placed in order. After OJT by the academy, Gujranwala WASA staff has worked for placing the items in order according to Mr. Ali Husnain, Assistant Director Mechanical. The following is the pictures for the progress.



during 5S activity



Storage as of April 6, 2018

Picture 6.6 Placing Items in Order at Storage

b) The basic condition survey for mechanical equipment was implemented. The detail is described in "6) Asset Management".

5) O&M of Electrical Equipment

The basic condition survey for electrical equipment was implemented. The detail is described in "6) Asset Management".

6) Asset Management

a) The basic asset condition survey at tube well was implemented for evaluating pump, motor, electrical cable insulation, and the others. Under this survey, 2 locations of tube well were evaluated (see Annex 6.7).

b) As mentioned in "4) O&M of Mechanical Equipment", the work place standardization and process optimization (5S) has been applied to the storage for materials and equipment. During 5S activity, boxes were labelled with ID number. Based on these ID numbers, database was developed.



Labelling to box as of April 6, 2018

| | A | B | C | D | E |
|----|---|-------------------------|-----|--------------|------------|
| 2 | | | | | |
| 3 | # | Name | QTY | Product Code | Company |
| 4 | 1 | Air Filter | 3 | ME073821 | Fuso |
| 5 | 2 | Filter Element Assembly | 10 | ME073160 | Mitsubishi |
| 6 | 3 | Air Filter | 13 | ME294400 | Mitsubishi |
| 7 | 4 | Oil Filter | 11 | ME227821 | Mitsubishi |
| 8 | 5 | Fule Filter | 10 | ME016841 | Mitsubishi |
| 9 | 6 | Fule Filter | 6 | ME229355 | Mitsubishi |
| 10 | 7 | Air Filter | 11 | ME995735 | Mitsubishi |

Database for Items at Storage

Picture 6.7 Labelling of Stock Together with 5S

7) Business Planning

none

(5) Rawalpindi WASA

1) O&M of Tube Well and Pump Facility

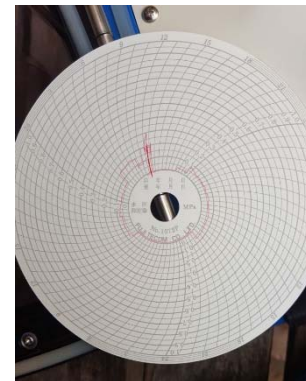
Mr. Samran Zahid, Sub Engineer, in West Zone 1 Sub Division used the pressure recorder, procured by this project, in order to record water pressure.



Preparation



Measurement and recording



Recorded Sheet

Picture 6.8 Pressure Recording by Pressure Recorder on Dec 20, 2017

2) Leak Detection

a) The ultrasonic flow meter, procured by this project, was used for measuring flowrate at distribution pipeline in West Zone 1 Sub Division by Mr. Samran Zahid, Sub Engineer.



Picture 6.9 Installation and Measurement of Flowrate by Ultrasonic Flow Meter on June 8, 2017

b) Water pressure was measured. Refer to "1) O&M of Tube Well and Pump Facility".

3) O&M of Sewer and Storm Water Drainage

a) In October - November 2017, six buried manhole covers were detected at UC-11 Khayaban - e- Sir Syed Rawalpindi by the sewerage team of Rawalpindi WASA. The instrument used for detection of buried manhole was metal locator, procured by this project. Such activities have been performed by the team regularly in the field according to Mr. Ali Gulraiz, Sub Engineer.



Picture 6.10 Survey on Buried Manhole Covers at Commercial Market in Rawalpindi

b) The multi gas meter, procured by this project, has been used during desilting activity in sewer line and manhole according to Mr. Afzal Baloch, Deputy Director (S & D).

4) O&M of Mechanical Equipment

a) Gland packings of valves at tube wells are replaced regularly according to Mr. Aamir Shah, Sub Engineer.



replacement of gland packing



decomposed valve

Picture 6.11 Replacement of Gland Packing in East Zone 60B Motimahal

b) Chlorine ratio was adjusted based on the training at the academy and OJT according to Mr. Aamir Shah, Sub Engineer.



Picture 6.12 Adjustment of Chlorine Ratio at Tube Well in East Zone 60B Motimahal

c) The scales attached to chlorinators were cleaned up for maintenance purpose according to Mr. Aamir Shah, Sub Engineer.



Picture 6.13 Cleaning of Scales Attached in Discharge Nozzle of Chlorinator at Tube Well in East Zone 60B Motimahal

5) O&M of Electrical Equipment

Daily operating data such as operations of Generator, air scour blower and chlorine cylinder consumption have been recorded according to the recording sheet obtained through the training at the academy (see Annex 6.8).

6) Asset Management

none

7) Business Planning

none

6.3 Suggestion to Achieving Overall Goal

The following is the detail of Overall Goal.

Overall Goal Water supply and sewerage service in 5 WASAs is improved.

Item 1 The target of the performance indicators on management and O&M are achieved.

JCC defined "target of the performance indicators" as "whether WASA applies activities trained through the training at Al-Jazari Academy every year or not" (see Annex 8.5). As indicated in Fig. 4.1, the continuous action is required for an improvement of WASAs' service. When WASA solves the current issue, another type/level of the issues will arise or be found. The function of the academy is to provide the training which meets the demands of WASAs. Through OJT at fields of WASA, the demands will be observed. Then the faculties shall revise materials, methodology, and/or approach of the trainings. Actually this revising action was performed during this project period. The faculties visited WASA for OJT. There were many new findings such as i) an issue on new parts of electrical equipment, ii) incomplete closing of sluice valve due to rust, iii) no installation of water tank for lubricant requiring a proper life span of pump bearing, etc.. Based on the findings, the faculties provided the trainings. In addition, it has been observed that the trainees, who participated the training at the academy, have implemented the knowledge and techniques to their daily activities at WASA without presences of the faculties of the academy, JICA Experts, and coordinators employed by JET as mentioned in "6.2 Achievement of Project Purpose". The improvement of WASA's service requires the implementation of continuous OJT and WASA's own activities. If continued, it is highly envisaged for achieving Overall Goal.

7 Issues, Approach, and Lessons through Project

The followings are issues, approach, and lesson in this project.

(1) "Learning by doing" for training led by Faculties

The training started from "Leak Detection" course on October 3, 2016. The faculties were trained for presentation and field activities just until a start of each course. It seemed that all faculties were very serious to give the training to WASA staff. It was observed that the confidence of the faculties was gradually improved by working along with JICA Experts and giving the trainings. This process might be called as "learning by doing". Since many activities are the first experience for the trainers and trainees, it was confirmed that this type of the methodology for the improvement is effective.

(2) Technical Benefit of OJT at WASA

The field activities at WASA started after the training in Fall 2016. OJTs were implemented by WASA staff, the faculties of the academy, JICA Experts, and coordinators employed by JET. Especially a demand on OJTs for mechanical and electrical equipment was extremely high since WASAs use them daily. Every activity for mechanical and electrical equipment was manually implemented such as replacement of gland packing, replacement of resin tank, measurement of flow rate, etc.. WASA's issues are complex, numerous and unique. Through OJT, the faculties discovered WASA's issues, which were included in the following training cycle with possible solutions.

(3) Operational Benefit of OJT at WASA

During OJT, WASA staff asked many questions to the faculties of the academy, JICA Experts, and the coordinators. OJT facilitated to provide more time to communicate, discuss, and understand the practical issues at WASA. As a result, the relation among them got stronger with each visit. In addition, OJT activity also helped with the future training nomination process. Overall OJT was ruled very crucial for the project sustainability.

(4) Contribution of PCC to sustainability

As mentioned in "4. Activities in Third Project Year (August 2017 - June 2018)" > "[C-7]" > "i) O&M of Tube Well and Pump Facility", the training course of "O&M of Tube Well and Pump Facility" in Spring 2018 was cancelled due to less participation. Then PCC discussed this issues, and agreed to reschedule this course. Of course, the cancellation should be avoided. However, the decision by PCC was the positive direction. The rescheduled training was successfully implemented. It was confirmed about an appropriate function of PCC and envisaged for the sustainable operation and management by recovering to the right track.

(5) Effectiveness of requiring attendance on training at Al-Jazari Academy for nomination of Training

in Japan

PCC decided the criteria of the nomination for the training in Japan in Third Project Year. One of the criteria was to attend the training at the academy. In order to meet the criteria, some of WASAs' staff attended the training at the academy. Therefore, this approach was effective in terms of enhancement to attend the training at the academy.

(6) Effectiveness of trainees for training in Japan from Sub Engineers

Sub Engineers from 5 WASAs were dispatched for the training in Japan in Second and Third Project Year. In total, 52 were dispatched to Japan. Out of them, Sub Engineer were 13. It was the first time to dispatch Sub Engineers of WASA for the foreign training. This project focuses on more daily activities at WASA. In the field, Sub Engineers play main role in the improvement of the daily activities. This was the main reason for focusing on Sub Engineers as the trainees for the training in Japan. This approach was very effective because it gave the motivation not only to the nominated Sub Engineers but also to the entire junior staff for participating the training at the academy and their daily work.

(7) Effectiveness of coordinators employed by JET

JET employed coordinators allocated to each WASA. The role of them was i) to support data collection which JET could not collect during the visit, ii) to remind the nomination of the upcoming training course, and iii) to inform the progress of OJT and issues arisen, etc.. However, in order to achieve the role, the coordinators shall have sufficient knowledge. In consideration of this aspect, the coordinators worked at the academy to learn the technical knowledge from JICA Experts together with the faculties of the academy. As a result, the coordinators could support the lectures, the field activities, and OJT to the faculties. It was very effective to enhance the achievement by the coordinators. It is recommended that the academy arrange the system to fill the gap created by the absence of the coordinators after this project.

(8) Sustainable action by accumulation of positive achievement

The academy needs to increase the trainers for the lectures and the field activities. In order to do so, the academy has implemented the training to Young Professionals since February 16, 2018. The training is that Young Professionals make the presentation based on the topic selected by themselves or given by the principal of the academy. Then the faculties give the comments. Since the project accumulated the positive achievement, the principal of the academy made an idea for such training. This idea is directly connected to the sustainability of the academy. In addition, this process is developing both future trainers and diversification of training topics based upon Water and Sanitation sector needs in Punjab and Pakistan.

8 JCC

JCC was held as shown in Table 8.1.

Table 8.1 Main Discussions at JCCs

| No | Date | Main Discussion | Reference |
|----|--------------|--|-----------|
| 1 | Sep 22, 2015 | - Approval of Inception Report - Revision of PDM | Annex 8.1 |
| 2 | May 16, 2016 | - Approval of training plan from October 2016 to March 2017. -Approval of organogram for Al-Jazari Academy - Approval of Progress Report (PR1) | Annex 8.2 |
| 3 | Nov 10, 2016 | - Nomination of trainees for training in Japan | Annex 8.3 |
| 4 | May 31, 2017 | - Progress of the project - Activity in third project year | Annex 8.4 |
| 5 | May 10, 2018 | - Approval of definition for Item 1 of Overall Goal and Item 2 of Project Purpose - Approval of Draft Final Report | Annex 8.5 |

Annex

| | |
|------------|---|
| Annex 1.1 | Minutes of the Meeting |
| Annex 1.2 | Record of Discussion |
| Annex 1.3 | PDM (Project Design Matrix) |
| Annex 1.4 | PO (Plan of Operations) |
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| Annex 2.2 | Detailed Activity Plan |
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| Annex 3.8 | Presentation Material for Field Training on O&M of Tube Well and Pump Facility under a Training on Teaching and Pedagogical Skills |

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| Annex 3.9 | Comments to Trainers for O&M of Tube Well and Pump Facility, and O&M of Sewer and Storm Water Drainage under a Training on Teaching and Pedagogical Skills |
| Annex 3.10 | Comments to Trainers for Courses of O&M of Sewer and Storm Water Drainage, and Asset Management |
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| Annex 3.12 | Newsletter, Vol. 2 |
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| Annex 3.14 | Training Schedule for Leakage Detection in Fall 2016 |
| Annex 3.15 | Training Schedule for O&M of Sewer and Storm Water Drainage in Fall 2016 |
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| Annex 3.39 | Questionnaire of Form A and B |
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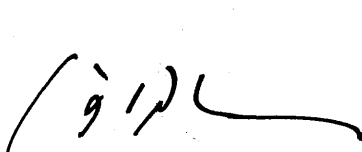
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Annex 1.1
Minutes of the Meeting

MINUTES OF MEETINGS
ON
JAPANESE TECHNICAL COOPERATION FOR
PROJECT FOR IMPROVING THE CAPACITY OF WASAs
IN PUNJAB PROVINCE
IN
THE ISLAMIC REPUBLIC OF PAKISTAN
AGREED UPON BETWEEN
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF
PAKISTAN
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

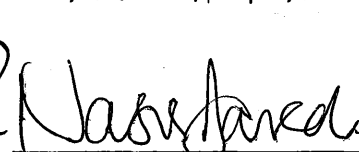
• Lahore, MARCH 31, 2015



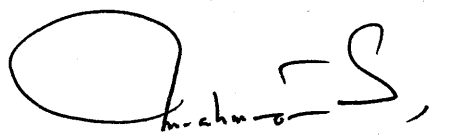
Mr. Mitsuyoshi Kawasaki
Chief Representative
JICA Pakistan Office



Mr. Asad Rehman Gillani
Secretary
Housing, Urban Development
and Public Health Engineering
Department,
Government of the Punjab



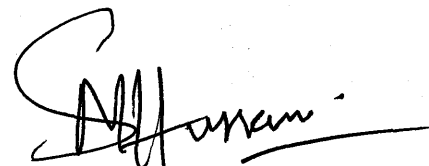
Dr. Nasir Javed
Chief Executive Officer
The Urban Sector Planning and
Management Services Unit Pvt.
Ltd (Urban Unit)
Planning and Development
Department,
Government of the Punjab



Mr. Ch. Naseer Ahmad
Managing Director
Water and Sanitation Agency
Lahore Development Authority

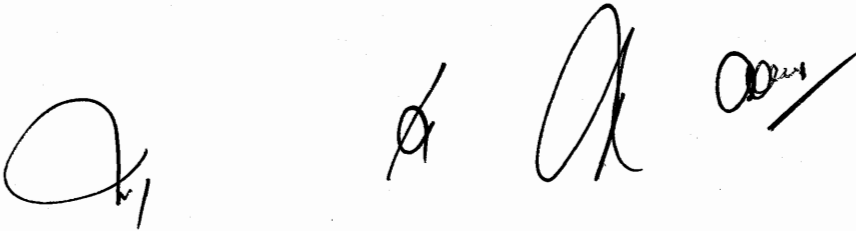


Dr. Aamer Ahmed
Secretary
Planning and Development
Department
Government of the Punjab



Mr. Syed Mujtaba Hussain
Joint Secretary(/Japan)
Economic Affairs Division
Islamic Republic of Pakistan

Japan International Cooperation Agency (hereinafter referred to as "JICA") held series of discussion with the authorities concerned of the Government of Pakistan (hereinafter referred to as "GOP") regarding the preparation and updating of the technical cooperation regarding the Project for Improving the Capacity of WASAs in Punjab Province (hereinafter referred to as "the Project"), based on the Minutes of the Meetings of the Project signed on 10 June, 2014. As a result of the discussion, both sides agreed the matters referred to in the document attached hereto.



THE ATTACHED DOCUMENT

I. Modification of Administration of the Project in the draft of Record of Discussion (hereinafter referred to as "R/D")

● IV. ADMINISTRATION OF THE PROJECT of R/D

Regarding the designation for Project Director Construction as described in clause IV. 2. of R/D draft confirmed by the minute signed on June 10, 2014, the Pakistani side requested to change as follows;

(Original Article)

Additional Secretary Technical, HUD&PHED

(Amended Article)

Deputy Managing Director Engineering, WASA Lahore

II. Amendment of Minutes of the Meetings signed on 10 June, 2014

● MAIN POINTS DISCUSSED "8. Other relevant Issues, 2) Schedule for implementation of the Project,"

The Pakistani side requested to modify the date of the issue of necessary notification as mandatory requirement for engineers and officials of WASAs, HUD&PHED and Service Providers from the end of September, 2014 to two months from the date the approval of the training system of WATSAN Academy by Joint Coordinating Committee of the Project. Both sides agreed to it as follows:

(Original Article)

(a) Government of the Punjab will issue necessary notification by the end of September, 2014 as mandatory requirement for engineers and officials of WASAs, Housing, Urban Development and Public Health Engineering Department (hereinafter referred to as "HUD&PHED") all water supply and sanitation service providers to acquire training in Punjab WATSAN Academy for promotion and confirmation in the service and assurance from all WASAs and other beneficiaries to contribute their necessary expense for sustainable operation of the Punjab WATSAN Academy after three years.

(Amended Article)

(a) Government of the Punjab will issue necessary notifications within

two (2) months from the date the approval of the training system of WATSAN Academy by Joint Coordinating Committee of the Project. as mandatory requirement for engineers and officials of WASAs, Housing, Urban Development and Public Health Engineering Department (hereinafter referred to as "HUD&PHED") all water supply and sanitation service providers from Basic Pay Scale (hereinafter referred to as "BPS") Grade 11 to BPS 20 or equivalent to acquire trainings in Punjab WATSAN Academy for promotion and confirmation in the service . _____

(b) Secretary HUD&PHED, Government of Punjab will also issue necessary instruction to WASAs with assurance from all WASAs and other beneficiaries within 3 months after signing of R/D to contribute their necessary expense annually for sustainable operation of the Punjab WATSAN Academy after three years.

(Original Article)

(f) JICA will process the draft of R/D for its internal approval and final R/D will be signed by the end of November 2014 once Government of the Punjab informs JICA Pakistan Office the completion of above mentioned 2) (a) to 2) (e).

(g) After handing over as described in clause 3.(page 1) above, the Management of Punjab WATSAN Academy will hire all Faculties of Punjab WATSAN Academy through open and competitive process as proposed in the existing PC-I. The Management of Punjab WATSAN Academy will fill in the list of Pakistani counterparts as shown in ANNEX IV of the R/D draft and notify name of counterparts before the commencement of the Project by the end of February 2015.

(h) After signing R/D, JICA will hire and dispatch the experts to Pakistan by the end of March 2015.

(Amended Article)

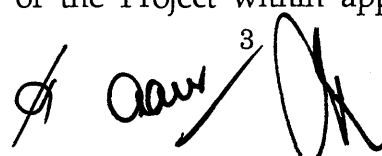
(f) JICA will process the draft of R/D for its internal approval and final R/D will be signed once Government of the Punjab informs JICA Pakistan Office the completion of above mentioned 2) (b) to 2) (e).

(g) After handing over as described in clause 3.(page 1) above, the Management of Punjab WATSAN Academy (Punjab Urban Unit) will hire all Faculties of Punjab WATSAN Academy through open and competitive process as proposed in the existing PC-I. The Punjab Urban Unit will fill in the list of Pakistani counterparts as shown in ANNEX IV of the R/D draft and notify name of counterparts before the commencement of the Project within approximately three (3) months

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after completion of signing the R/D.

(h) After signing R/D, JICA will hire and dispatch the experts to Pakistan within approximately four (4) months after completion of signing the R/D as per list agreed Annex II of draft R/D.

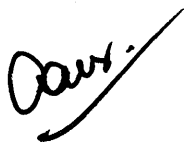
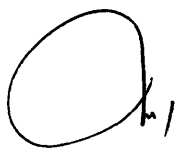
(i) JICA will procure Lap top PCs for faculties, projectors and screens for lecture, and necessary number of UPS before the beginning of the project as per Annex III of R/D. Other machinery and equipment in Annex III of R/D will be provided by JICA in consultation with the PCC & Management of the Academy (Punjab Urban Unit) in the first year of the project.

III. Others

1. Government of the Punjab has informed JICA Pakistan Office the completion of mentioned Minutes of the Meetings signed on 10 June, 2014 "MAIN POINTS DISCUSSED 8. Other relevant Issues, 2) Schedule for implementation of the Project" (b) to (e). on December 2014
2. Government of the Punjab will complete the interior decoration and furnishing for the Punjab WATSAN Academy building before arrival of JICA Project Team as per the plan given in the revised PC-I.
3. All matters other than those mentioned above will be treated in the same manner as prescribed in the Articles of Appendix.

Appendix Minutes of the Meetings signed on 10 June, 2014.

END



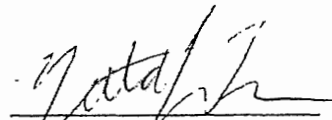
**MINUTES OF MEETINGS
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE ISLAMIC REPUBLIC OF PAKISTAN
ON
JAPANESE TECHNICAL COOPERATION FOR
PROJECT FOR IMPROVING THE CAPACITY OF WASAs
IN PUNJAB PROVINCE**


Japan International Cooperation Agency (hereinafter referred to as "JICA") has dispatched the Second Detailed Planning Survey Team (hereinafter referred to as "the Team") headed by Mr. Yutaka Fukase to the Islamic Republic of Pakistan (hereinafter referred to as "Pakistan") from May 25 to June 14, 2014 for the purpose of preparation and updating of the technical cooperation regarding the Project for Improving the Capacity of WASAs in Punjab Province (hereinafter referred to as "the Project").

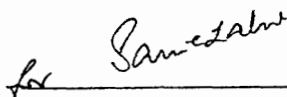
During its stay in Pakistan, the Team exchanged their views and had a series of discussions for the purpose of working out the framework and contents of the Project with the authorities concerned of Punjab, Pakistan.

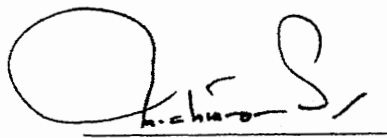
As a result of discussions, both sides came to understanding concerning the matters referred to in the document attached hereto.

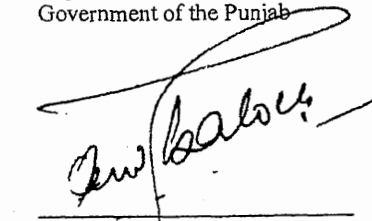
Lahore, June 10 2014

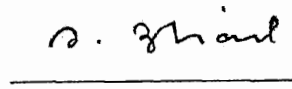

Mr. Yutaka Fukase
Leader
Detailed Planning Survey Team,
Japan International Cooperation
Agency


Dr. Arshad Mahmood
Secretary
Housing, Urban Development and
Public Health Engineering
Department,
Government of the Punjab


Dr. Nasir Javed
Chief Executive Officer
The Urban Sector Planning and
Management Services Unit Pvt.
Ltd (Urban Unit)
Planning and Development
Department,
Government of the Punjab


Mr. Ch. Naseer Ahmad
Managing Director
Water and Sanitation Agency
Lahore Development Authority


Mr. Arif Anwar Baloch
Secretary
Planning and Development
Department
Government of the Punjab


Ms. Shaista Sohail
Joint Secretary (ADB/Japan)
Economic Affairs Division
Islamic Republic of Pakistan

MAIN POINTS DISCUSSED

1. Latest Minutes of Meetings

Both sides agreed that the Minutes of Meeting agreed on 10 June 2014 prevails over Minutes of Meeting agreed on January 26, 2010.

2. Title of the Project

Both sides agreed that the title of the Project will be "Project for Improving the Capacity of WASAs in Punjab Province" through strengthening of "Punjab Water and Sanitation Academy, Lahore (hereinafter referred to as "Punjab WATSAN Academy").

3. Implementation Agency and Management Agency of Punjab WATSAN Academy

Both sides agreed that implementation agency of the project is Housing, Urban Development and Public Health Engineering Department (hereinafter referred to as "HUD&PHED"). Though in Minutes of Meeting agreed on January 26, 2010, both sides had assumed WASA Lahore would manage Punjab WATSAN Academy, the management of the Punjab WATSAN Academy will be handed over to the Urban Unit with a separate agreement. This process will be completed by WASA Lahore through HUD&PHED by the end of September, 2014. However, the asset of Punjab WATSAN Academy will be owned by WASA Lahore.

4. Draft of Record of Discussions

As a result of the discussions, both sides agreed on the draft of Record of Discussions (hereinafter referred to as "R/D"), which stipulates the framework of the Project, shown in **Appendix I**. After the approval of implementation of the Project by both JICA headquarters and Pakistani side, the R/D will be finalized and signed by JICA Pakistan office and the authorities concerned of Governments of Punjab and Pakistan.

The Team explained that the attached R/D was draft and was subject to change in the authorization process by the competent authorities of both sides. The Team also explained that this Minutes of Meetings was a technical document to inscroll discussion results between the authorities concerned of Governments of Punjab and Pakistan and the Team as a preparation process to formulate R/D.

5. Project Design Matrix (PDM)

The Team explained that the Project Design Matrix (hereinafter referred to as "PDM") is commonly used in Japanese technical cooperation in order to manage and implement projects efficiently and effectively. It will also be used as a reference for monitoring and evaluating the Project.

As a result of discussions, both sides agreed to apply the tentative PDM as shown in **Appendix II** to the Project with following understanding:

- 1) The PDM is a logically designed matrix which defines the initial understanding of the framework of the Project and indicates the logical steps toward the achievement of the Project purpose.
- 2) The PDM is to be flexibly revised according to the progress and achievements of the Project, upon approval by the Joint Coordinating Committee, shown in **ANNEX VI** of the draft of R/D.

6. Duration and Schedule of the Project

The duration of the Project would be three (3) years from the date when the expert(s) arrives. The Plan of Operation has been tentatively formulated according to the draft of R/D. The Draft of Plan of

Operation for the entire period of the Project is shown in **Appendix III**.

The Annual Plan of Operation is to be drafted by both Government of the Punjab, Pakistan and Japanese sides according to the Plan of Operation and is to be submitted to the Joint Coordinating Committee. The activities are subject to change within the scope of the R/D, if necessity arises, in the course of the Project implementation.

7. The role of WASAs

1) Leading WASA

On the commencement of the Project, each WASA will be assigned as leading WASA who will implement best practices of assigned fields to implement the capacity building acquired. Each Leading WASA has to provide the necessary information, pilot site and the staff in charge to Punjab WATSAN Academy.

2) Establishment of OJT program in each WASA

Each WASA will also establish the OJT program in the following fields. Necessary equipment for OJT will be provided as **ANNEX III**.

- i) O&M of tube well and pump facility
- ii) Leakage detection and repair
- iii) O&M of sewer and storm water drainage including safety precautions
- iv) O&M of disposal stations
- v) Asset management for water supply and sewerage system

8. Other relevant Issues

1) PC-I budget

Pakistani side explained that PC-I for the Project would be revised by September 2014 for following components.

- Boundary Wall
- Purchase of additional Furniture and Fixtures
- Equipment and Machinery for laboratory and library
- Vehicles for trainees and site visits
- Enhanced Salaries for Punjab WATSAN Academy staff
- Generator
- Hostel for fifty (50) for trainee
- Any other Equipment if required for Punjab WATSAN Academy and OJT activities in WASAs

Pakistani side will inform JICA Pakistan Office about the amount of the PC-I budget for the Project immediately after getting approval from PDWP

PC-I budget will cover necessary expenses including infrastructure improving, staff salary, and travel expenses for training, daily consumables for the Project, over an entire period of the Project

2) Schedule for implementation of the Project

Both sides confirmed the following schedule. If the following schedule would delay, one side should inform the other side.

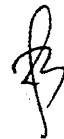
- (a) Government of the Punjab will issue necessary notification by the end of September, 2014 as

mandatory requirement for engineers and officials of WASAs, Housing, Urban Development and Public Health Engineering Department (hereinafter referred to as "HUD&PHED") all water supply and sanitation service providers to acquire training in Punjab WATSAN Academy for promotion and confirmation in the service and assurance from all WASAs and other beneficiaries to contribute their necessary expense for sustainable operation of the Punjab WATSAN Academy after three years.

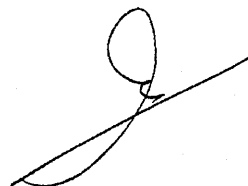
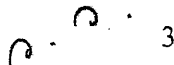
- (b) Government of the Punjab will prepare a revised PC-I for the project of Punjab WATSAN Academy and it will be approved by PDWP (Provincial Development Working Party) for approval by the end of September 2014. The approved budget will be disbursed as per requirement from the annual develop program 2014/15.
- (c) The management of the Punjab WATSAN Academy will be handed over to the Urban Unit with a separate agreement after obtaining approval from the competent authority. This process will be completed by WASA Lahore through HUD&PHED by the end of September.
- (d) The timeline of recruitment for Principal and faculties will be provided by the end of October 2014.
- (e) Government of the Punjab will complete the construction, interior decoration and furnishing for the Punjab WARSAN Academy building by the end of October, 2014 as per the plan given in the existing PC-I.
- (f) JICA will process the draft of R/D for its internal approval and final R/D will be signed by the end of November 2014 once Government of the Punjab informs JICA Pakistan Office the completion of above mentioned 2) (a) to 2) (e).
- (g) After handing over as described in clause 3.(page 1) above, the Management of Punjab WATSAN Academy will hire all Faculties of Punjab WATSAN Academy through open and competitive process as proposed in the existing PC-I. The Management of Punjab WATSAN Academy will fill in the list of Pakistani counterparts as shown in ANNEX IV of the R/D draft and notify name of counterparts before the commencement of the Project by the end of February 2015.
- (h) After signing RD, JICA will hire and dispatch the experts to Pakistan by the end of March 2015.

3) Assurance quality and sustainability

Government of the Punjab expressed to establish the project coordination committee (hereinafter referred to as "PCC") in order to assure the quality and sustainability of the project. Government of the Punjab also expressed necessity of devising of the system and mechanism for quality assurance of curriculum preparation, review and updating. This will also include ensuring quality of teaching and learning. JICA agreed on the necessity of quality assurance and it will be supported through the Project.



- Appendix I Draft of Record of Discussions
- Appendix II Draft of Project Design Matrix
- Appendix III Draft of Plan of Operation
- Appendix IV Draft of Implementation Structure



RECORD OF DISCUSSIONS
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
AUTHORITIES CONCERNED OF
THE ISLAMIC REPUBLIC OF PAKISTAN
ON
JAPANESE TECHNICAL COOPERATION
FOR
PROJECT FOR IMPROVING THE CAPACITY OF WASAs
IN PUNJAB PROVINCE

Appendix I

The Japan International Cooperation Agency (hereinafter referred to as "JICA"), through the Chief Representative of JICA Pakistan Office, exchanged the views and had a series of discussions with the related Pakistan authorities with respect to desirable measures to be taken by JICA and the Government of the Islamic Republic of Pakistan (hereinafter referred to as "Pakistan") for the successful implementation of the Project for Improving the Capacity of WASAs in Punjab Province (hereinafter referred to as "the Project").

As a result of the discussions, and in accordance with the provisions of the Agreement on Technical Cooperation between the Government of Japan and the Government of Pakistan, signed in Islamabad on April 30, 2005 (hereinafter referred to as "the Agreement"), JICA and Pakistan authorities concerned agreed on the matters referred to in the document attached hereto.

Lahore, XX, XXX, 2014

Mr. Mitsuyoshi Kawasaki
Chief Representative
JICA Pakistan Office

Dr. Arshad Mahmood
Secretary
Housing, Urban Development and
Public Health Engineering
Department,
Government of the Punjab

Dr. Nasir Javed
Chief Executive Officer
The Urban Sector Planning and
Management Services Unit Pvt.
Ltd (Urban Unit)
Planning and Development
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Mr. Ch. Naseer Ahmad
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Mr. Arif Anwar Baloch
Secretary
Planning and Development
Department
Government of the Punjab

Ms. Shaista Sohail
Joint Secretary (ADB/Japan)
Economic Affairs Division
Islamic Republic of Pakistan

THE ATTACHED DOCUMENT

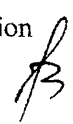
I. COOPERATION BETWEEN JICA AND THE GOVERNMENT OF PAKISTAN

1. The Government of Pakistan and the Government of Punjab will implement the Project for Improving the Capacity of WASAs in Punjab Province (hereinafter referred to as "the Project") in cooperation with JICA.
2. The Project will be implemented in accordance with the Master Plan which is given in ANNEX I.

II. MEASURES TO BE TAKEN BY JICA

In accordance with the laws and regulations in force in Japan and provisions of Article III of the Agreement, JICA, as the executing agency for technical cooperation of the Government of Japan, will take, at its own expense, the following measures according to the normal procedures of its technical cooperation scheme.

1. DISPATCH OF JICA EXPERTS

JICA will provide the services of JICA Experts as listed in ANNEX II. The provision of Article VIII of the Agreement will be applied to the above-mentioned experts. 

2. PROVISION OF EQUIPMENT

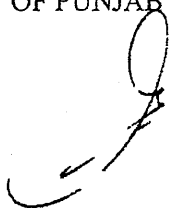
JICA will provide such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Annex III. The provision of Article VII of the Agreement will be applied to the Equipment.

3. TRAINING OF PAKISTANI PERSONNEL IN JAPAN

JICA will receive the Government of Pakistan personnel connected with the Project for technical training in Japan.

III. MEASURES TO BE TAKEN BY THE GOVERNMENT OF PAKISTAN AND THE GOVERNMENT OF PUNJAB

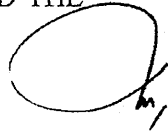
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2.2.



1. The Government of Pakistan and the Government of Punjab will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.
2. The Government of Pakistan and the Government of Punjab will ensure that the technologies and knowledge acquired by the Pakistan nationals as a result of Japanese technical cooperation will contribute to the economic and social development of Pakistan.
3. In accordance with the provision of Article V of the Agreement, the Government of Pakistan and the Government of Punjab will grant in Pakistan privileges, exemptions and benefits to the JICA Experts referred to in II-1 above and their families.
4. In accordance with the provision of Article VII of the Agreement, The Government of Pakistan and the Government of Punjab will take the measures necessary to receive and use the Equipment provided by JICA referred to in II-2 above and equipment, machinery and materials carried in by JICA Experts referred to in II-1 above.
5. The Government of Pakistan and the Government of Punjab will take necessary measures to ensure that the knowledge and experience acquired by the Pakistani personnel from technical training in Japan will be utilized effectively in the implementation of the Project.
6. In accordance with the provision of Article V-(2)-(b) of the Agreement, the Government of Pakistan and the Government of Punjab will provide the services of Pakistani counterpart personnel and administrative personnel as listed in ANNEX IV.
7. In accordance with the provision of Article V-(2)-(a) of the Agreement, the Government of Pakistan and the Government of Punjab will provide the buildings and facilities as listed in ANNEX V.
8. In accordance with the laws and regulations in force in Pakistan, the Government of Pakistan and the Government of Punjab will take necessary measures to supply or replace at its own expense machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided by JICA under II-2 above.

9. In accordance with the laws and regulations in force in Pakistan, the Government of Pakistan and the Government of Punjab will take necessary measures to meet the running expenses necessary for the implementation of the Project.
10. The Government of Pakistan and the Government of Punjab will take necessary measures to ensure security of Experts, the member of the missions the Representative, the Staff and their families staying in the Pakistan in accordance with the provision of Article X of the Agreement.

IV. ADMINISTRATION OF THE PROJECT

1. Secretary Housing, Urban Development and Public Health Engineering Department, Government of the Punjab (hereinafter referred to as "HUD&PHED"), as Chairman of the Joint Coordinating Committee of the Project, will bear overall responsibility for the coordination and oversight of the Project.
2. Additional Secretary Technical, HUD&PHED, will be the Project Director Construction, and will be responsible for timely completion of the construction project and report to the Secretary (HUD&PHED).
3. Chief Executive Officer (hereinafter referred to as "CEO"), The Urban Sector Planning and Management Services Unit Pvt. Ltd (hereinafter referred to as "the Urban Unit"), as Project Director Management, will be responsible for management of the Punjab WATSAN Academy and report to the Secretary (HUD&PHED) and act as Secretary to Joint Coordinating Committee. 
4. Principal of Punjab WATSAN Academy, as Project Manager, will be responsible for the implementation of training activities in Punjab WATSAN Academy and pilot activities in each WASA with their consultation and cooperation.
5. JICA Chief Advisor will provide necessary recommendations and advice to the Secretary (HUD&PHED), Project Director Management and Project Manager on any matters pertaining to the implementation of the Project as and when required.
6. JICA Experts will give necessary technical guidance and advice to Pakistani counterpart

personnel on technical matters pertaining to the implementation of the Project.

7. For the effective and successful implementation of technical cooperation for the Project, a Joint Coordinating Committee will be established whose functions and composition are described in ANNEX VI.

V. CLAIMS AGAINST JICA EXPERTS

In accordance with the provision of Article VI of the Agreement, the Government of Pakistan and the Government of Punjab undertakes to bear claims, if any arises, against JICA Experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in Pakistan except for those arising from the willful misconduct or gross negligence of JICA Experts.

VI. MUTUAL CONSULTATION

There will be mutual consultation between JICA and the Government of Pakistan and the Government of Punjab on any major issues arising from, or in connection with this Attached Document.

VII. MEASURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT

For the purpose of promoting support for the Project among the people of Pakistan, the Government of Pakistan and the Government of Punjab will take appropriate measures to make the Project widely known to the people of Pakistan.

VIII. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be three (3) years from the date when the expert(s) arrives.

ANNEX I MASTER PLAN

ANNEX II LIST OF EXPERTS

ANNEX III TENTATIVE LIST OF MACHINERY AND EQUIPMENT

ANNEX IV LIST OF PAKISTANI COUNTERPART AND ADMINISTRATIVE
PERSONNEL
ANNEX V LIST OF BUILDING AND FACILITIES
ANNEX VI JOINT COORDINATING COMMITTEE
ANNEX VII PROJECT COORDINATION COMMITTEE

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ANNEX I MASTER PLAN

1. Title of the Project

The project for Improving the Capacity of WASAs in Punjab Province

2. Overall goal

Water supply and sewerage service in WASAs is improved.

3. Project purpose

Punjab WATSAN Academy is functioned as a training institute for capacity development of staff of WASAs and the public water sector.

4. Outputs

- (1) Training system of Punjab WATSAN Academy is established.
- (2) The faculties at Punjab WATSAN Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management.
- (3) OJT is implemented by trainees of WASAs trained at Punjab WATSAN Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management.

5. Activities

1-1 To review Master Plan of Project and management plan including budget, facility, personnel and organization system, and provide recommendation if necessary.

1-2 To grasp needs for training of WASAs.

1-3 To assess capacities at WASAs for

- i) O&M on tube well and pump facility
- ii) leakage detection and repair
- iii) O&M of sewer and storm water drainage
- iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage

v) Management of assets and operational and business planning

1-4 To develop capacity building a training framework, curriculum, training material and training aid related to

- i) basic knowledge and skills on water and sewerage system utilities business management including reporting SOP, planning and design of water supply including network zoning and sewer/storm water drainage including hydraulic analysis of pipeline network, water quality management and water safety plan, sewer and storm water drainage, and sewerage system management.
- ii) professional knowledge and skills on
 - a) O&M of tube well and pump facility
 - b) leakage detection and repair
 - c) O&M of sewer and storm water drainage including safety precaution and Health Safety and Environment

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- d) O&M of disposal station.
 - e) asset management for water supply and sewerage system.
 - f) reporting and compliance
- 1-5 To formulate annual training implementation plan.
- 1-6 To train Punjab WATSAN Academy staff to acquire capacity of training coordination.
- 1-7 To train Punjab WATSAN Academy staff to acquire teaching and pedagogical skills.
- 1-8 To establish evaluation and testing mechanism for training course and Punjab WATSAN Academy staff for quality assurance.
- 1-9 To revise manual, training curriculum and training material for improving training course.
- 1-10 To develop and establish the procedure of Output 3.
- 2-1 To conduct training course(s) for basic knowledge.
- 2-2 To conduct training course(s) for a subject of
- i) O&M of tube well and pump facility
 - ii) leakage detection and repair
 - iii) O&M of sewer and storm water drainage including safety precaution
 - iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage
 - v) asset management for water supply and sewerage system.
- 2-3 To prepare an OJT plan for a subject of
- i) O&M of tube well and pump facility
 - ii) leakage detection and repair
 - iii) O&M of sewer and storm water drainage including safety precaution
 - iv) O&M of disposal station
 - v) asset management for water supply and sewerage system.
- 2-4 To conduct regular training course(s) updated contents through previous training and OJT activities for a subject of
- i) O&M of tube well and pump facility
 - ii) leakage detection
 - iii) O&M of sewer and storm water drainage including safety precaution
 - iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage
 - v) asset management for water supply and sewerage system
- 3-1 To conduct OJT to WASA's workers by the trainees at Punjab WATSAN Academy as planned on the activity 2-3 for a subject of
- i) O&M of tube well and pump facility
 - ii) leakage detection
 - iii) O&M of sewer and storm water drainage
 - iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage
 - v) asset management for water supply and sewerage system

Note:

Training curriculum describes training course with schedule including training methods, tools, class room and field component and contact time and assessment requirement . Training material includes but not limited to lectures, class room discussions, case study, guest lecture, site visits, use of equipment and assessment of existing situations is used for training course and its approaches. Manual describes how to use equipment and report with its O&M frequency and improvement strategies.

Pump facility is located at tube well. Disposal station is the place for pumping up including all civil, electrical and mechanical devises and system sewage.

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ANNEX II LIST OF JICA EXPERTS

- Fields of Experts

- 1) Chief advisor/ training management/O&M of water sector
- 2) Leak detection
- 3) O&M of Water supply facilities including Mechanical and electrical equipment
- 4) O&M of Drainage and Sewerage
- 5) Water utilities business management including asset management and planning
- 6) Curriculum development and Assessment
- 7) Training skill

Note:

JICA Experts will be added as the need arises for the smooth and effective implementation of the Project.

ANNEX III TENTATIVE LIST OF MACHINERY AND EQUIPMENT

| | Year | 2014 |
|-----|--|-------|
| | Items of Equipment | Total |
| 1 | Equipment for Common use in Punjab WATSAN Academy | |
| | a) Laptop PC for faculty staff | 16 |
| | b) Projector and screen for lecture | 5 |
| | c) Necessary number of UPS | - |
| 2 | Equipment for training | |
| 2-1 | Equipment for water supply tube well and pump facility | |
| | a) Portable ultrasonic-flow meter including pressure gauge | 7 |
| 2-2 | Equipment for leak detection | |
| | a) Metal locator | 8 |
| | b) Non-metallic pipe locator | 8 |
| | c) Acoustic leak detector | 8 |
| | d) Acoustic bar | 8 |
| | e) Metal pipe locator | 8 |
| | f) Distance meter | 8 |
| | g) Pressure recorder | 6 |
| 2-3 | Equipment for safety precaution | |
| | a) Multi Gas (CO, H ₂ S, CH ₄ , O ₂) meter | 12 |

Note: If JICA can justify the necessity of 1 a) and b) ,JICA will provide necessary equipment.

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ANNEX IV LIST OF PAKISTANI COUNTERPART AND ADMINISTRATIVE PERSONNEL

| No | Project Position | Position | Organization |
|----|---|--------------------------------|---|
| 1 | Chairman | Secretary | Housing, Urban Development and Public Health Engineering Department, Government of the Punjab |
| 2 | Project Director Construction | Additional Secretary Technical | HUD&PHED |
| 3 | Project Director Management | CEO | the Urban Unit (through an agreement) |
| 4 | Project Manager | Principal | Punjab WATSAN Academy |
| 5 | Administration | Manager | Finance and Admin, Punjab WATSAN Academy |
| 6 | OJT Manager in Lahore | Managing Director | WASA Lahore |
| 7 | OJT Manager in Faisalabad | Managing Director | WASA Faisalabad |
| 8 | OJT Manager in Rawalpindi | Managing Director | WASA Rawalpindi |
| 9 | OJT Manager in Gujranwala | Managing Director | WASA Gujranwala |
| 10 | OJT Manager in Multan | Managing Director | WASA Multan |
| 11 | Water supply specialist | Faculty | Water supply, Punjab WATSAN Academy |
| 12 | Sewerage and waste water treatment Specialist | Faculty | Drainage and Sewerage, Punjab WATSAN Academy |
| 13 | Curriculum and Instruction design specialist | Faculty | Curriculum Development, Punjab WATSAN Academy |
| 14 | Technical skill based training specialist | Faculty | Training Specialist, Punjab WATSAN Academy |
| 15 | Instructors | Faculty | Training Faculty, Punjab WATSAN Academy |

Note:

Counterpart personnel will be added as the need arises for the smooth and effective implementation of the Project.

ANNEX V LIST OF BUILDING AND FACILITIES

Pakistani side will arrange the following items.

1. Furnished and air-conditioned office spaces in Punjab WATSAN Academy, which can accommodate 10 persons.
2. Facilities such as desks, chairs, book shelves, internet access and telephones, etc. necessary for the Project activities.
3. Rooms and spaces necessary for installation and storage of the Equipment
4. Other facilities mutually agreed upon as necessary

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ANNEX VI JOINT COORDINATING COMMITTEE

1. Functions

A Joint Coordinating Committee will be organized and notified. The committee meeting will be held at least once a year and whenever need arises.

The functions of the Committee are as follows.

- 1) To supervise the annual work plan of the Project in line with the Plan of Operations.
- 2) To review the annual and overall progress of the Project and to evaluate the accomplishment of the annual targets and achievement of the objectives.
- 3) To identify proper ways and means for solution of the major issues arising from or in connection with the Project.

2. Composition

1) Chairperson:

Secretary Housing, Urban Development and Public Health Engineering Department

2) Members of Pakistani side:

Representative of Planning and Development Department, Government of the Punjab
(Not less than Grade 19 officers)

CEO the Urban Unit, Planning and Development Department (Secretary of JCC)

Senior Water and Sanitation Specialist Urban Unit, Planning and Development Department

Principal, Punjab WATSAN Academy

Managing Director WASA Lahore

Managing Director WASA Faisalabad

Managing Director WASA Rawalpindi

Managing Director WASA Multan

Managing Director WASA Gujranwala

Other personnel concerned, to be assigned by Chairperson of JCC, if necessary

3) Members of the Japanese Side:

Representative of JICA

JICA Experts

Other personnel concerned, to be assigned by JICA, if necessary

Note:

Official(s) of the Economic Affairs Division and the Embassy of Japan in Pakistan may attend as observer(s).

ANNEX VII PROJECT COORDINATION COMMITTEE (PCC)

1. Functions

The Planning and Coordination of the Training Punjab WATSAN Academy will be institutionally through already notified by secretary HUD&PHED 26th February, 2010 (No. SO(UD)3-22/2009). Project Coordination Committee (PCC) notified by Secretary HUD&PHED. The PCC comprises of the following members.

The functions of the Committee are as follows.

- 1) Approve Training Program and its Framework
- 2) Establish overall policy and procedures for the development and maintenance of each of the professional programs.
- 3) Develop, review and update the standards for individual course approval for each professional program.
- 4) Review and approve courses for inclusion in the Catalog of Approved Courses for each professional program on a quarterly basis.
- 5) Propose fees for departments /individual from Public and Private sectors
- 6) Notify Essential Requirement at each stage of the staff career
- 7) Establish and monitor filed support system for WASA staff
- 8) Performance Review of Principle and Core Faculty
- 9) Approval of budget and audit reports
- 10) Approval of Rules of Business

2. Composition

1) Chairperson:

CEO Urban Unit (Chairperson)

2) Members of Pakistani side:

MD WASA Lahore

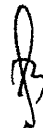
Principal of the Punjab WATSAN Academy (Secretary)

Representative from HUD/PHED

Representative from Planning and Development Department, Government of the Punjab

3) Members of the Japanese Side:

JICA Chief Advisor of the Project



PM Form 1 PDM

Project Design Matrix

Project Title: Project for Improving the Capacity of WASAs in Punjab Province**Implementing Agency:** HUD/PHED, Urban Unit**Target Group:** (Direct) The faculty of Punjab WATSAN academy and staff of 5 WASAs
(Indirect) Residents of 5 cities and staff of public water sector in Punjab**Period of Project:** 2015-2017 (3 years)**Project Site:** City of Lahore, Rawalpindi, Gujranwala, Faisalabad and Multan

Version 0

Dated June 10, 2014

| Narrative Summary | Objectively Verifiable Indicators | Means of Verification | Important Assumption | Achievement | Remarks |
|---|--|---|--|-------------|---------|
| Overall Goal Water supply and sewerage service in 5 WASAs is improved. | 1 The target of the performance indicators on management and O&M are achieved. ¹ | 1 Statistical / annual report/Bench making report of WASAs | | | |
| Project Purpose Punjab WATSAN Academy is functioned as a training institute for capacity development of staff of WASAs and the public water sector. | 1 Training courses are conducted as planned. 2 Performance indicators related to management and O&M are improved. ² | 1 Training records 2 Performance indicator records of WASAs | | | |
| Outputs 1. Training system of Punjab WATSAN Academy is established. | 1-1 Training curriculum and training material/manual are developed for tube well and pump facility, leakage detection, sewer and storm water drainage, disposal station, and asset management. 1-2 Evaluation mechanism for training course and WATSAN Academy staff is established. 1-3 Training curriculum and training material/manual are revised regularly. 1-4 Annual training plan is made every year. | 1-1 Training curriculum and training material/manual ³ 1-2 Evaluation report 1-3 Revised manual, training curriculum and training material 1-4 Annual training plan | 1. Trained Punjab WATSAN Academy staffs do not leave Punjab WATSAN Academy | | |

| | | | | | |
|--|---|---|--|--|--|
| <p>2. The faculties at Punjab WATSAN Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management.</p> <p>3. OJT is implemented by trainees of WASAs trained at Punjab WATSAN Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management.</p> | <p>2-1 Regular training course(s) is conducted by Punjab WATSAN Academy staff.</p> <p>2-2 More than 80 % of trainees participating in the training courses pass the level check test.</p> <p>3-1 The following OJT activities are implemented with an application of the obtained knowledge and technique at Punjab WATSAN Academy.</p> <p>i) O&M of tube well and pump facility</p> <p>ii) leakage detection</p> <p>iii) O&M of sewer and storm water drainage</p> <p>iv) O&M of disposal station</p> <p>v) asset management</p> | <p>2-1 Training records</p> <p>2-2 Records of level check test</p> <p>3-1 OJT records</p> | | | |
|--|---|---|--|--|--|

| Activities | Inputs | | Pre-Conditions |
|---|--|--|---|
| | The Japanese Side | The Pakistan Side | |
| <p>1-1 To review Master Plan of Project and management plan including budget, facility, personnel and organization system, and provide recommendation if necessary.</p> <p>1-2 To grasp needs for training of WASAs.</p> <p>1-3 To assess capacities at WASAs for</p> <p>i) O&M on tube well and pump facility</p> <p>ii) leakage detection</p> <p>iii) O&M of sewer and storm water drainage</p> <p>iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage</p> <p>v) Management of assets and operational and business planning</p> <p>1-4 To develop capacity building a training framework, curriculum, training material and training aid related to</p> <p>i) basic knowledge and skills on water and sewerage business management including reporting Standard Operating Procedure, planning and design of water supply and sewer/storm water drainage including hydraulic analysis of pipeline network, water quality management and water safety plan, sewer and storm water drainage, and sewerage system management.</p> | <p>1. Expert</p> <p>1) Chief advisor/ training management/O&M of water sector</p> <p>2) Leak detection</p> <p>3) O&M of Water supply facilities including Mechanical and electrical equipment</p> <p>4) O&M of Drainage and Sewerage</p> <p>5) Water utilities business management including asset management and planning</p> <p>6) Curriculum development and Assessment</p> <p>7) Training skill</p> <p>2. Equipment</p> <p>1) Equipment for O&M of water supply tube well and pump facilities</p> <p>2) Equipment of leak detection</p> <p>3) Equipment for safety precaution</p> <p>3. Training in Japan</p> <p>- Counterpart trainees from Punjab WATSAN Academy and WASAs</p> | <p>1. Counterpart personnel</p> <p>2. Office space and facilities</p> <p>3. Necessary data/ information</p> <p>4. Local cost</p> <p>5. Suitable security arrangement and advice</p> <p>6. - Alteration/renovation works</p> <p>- Electric Works</p> <p>- Services (Water supply and sewage)</p> <p>- Purchase of Furniture and Fixtures</p> <p>- Equipment and Machinery</p> <p>- Vehicles</p> <p>- Salaries for Punjab WATSAN Academy staff</p> <p>- Operation and Maintenance Cost (Other than salaries)</p> | <p>[Pre-conditions]</p> <p>1. To be approved PC-1 by the Planning Commission (CDWP)</p> <p>2. To employ Punjab WATSAN Academy staffs</p> <p>3. To prepare management plan of Punjab WATSAN Academy including budget, facility, personnel and organization system</p> <p style="text-align: center;">➡</p> <p><Issues and countermeasures></p> |

li) professional knowledge and skills on
 a) O&M of tube well and pump facility
 b) leakage detection and management
 c) O&M of sewer and storm water drainage including safety precaution and HSE
 d) O&M of disposal station.
 e) asset management for water supply and sewerage system.
 f) reporting and compliance
 1-5 To formulate annual training implementation plan.
 1-6 To train Punjab WATSAN Academy staff to acquire capacity of training coordination.
 1-7 To train Punjab WATSAN Academy staff to acquire teaching and pedagogical skills.
 1-8 To establish evaluation and testing mechanism for training course and Punjab WATSAN Academy staff for quality assurance.
 1-9 To revise manual, training curriculum and training material for improving training course.
 1-10 To develop and establish the procedure of Output 3.

2-1 To conduct training course(s) for basic knowledge.

2-2 To conduct training course(s) for a subject of

- i) O&M of tube well and pump facility
- ii) leakage detection
- iii) O&M of sewer and storm water drainage including safety precaution
- iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage
- v) asset management for water supply and sewerage system.
- vi) management of assets and operational and business planning

2-3 To prepare an OJT plan for a subject of

- i) O&M of tube well and pump facility
- ii) leakage detection
- iii) O&M of sewer and storm water drainage including safety precaution
- iv) O&M of disposal station
- v) asset management for water supply and sewerage system.

2-4 To conduct regular training course(s) updated contents through previous training and OJT activities for a subject of

- i) O&M of tube well and pump facility
- ii) leakage detection

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iii) O&M of sewer and storm water drainage including safety precaution
 iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage
 v) asset management for water supply and sewerage system.

3-1 To conduct QJT to WASA's workers by the trainees at Punjab WATSAN Academy as planned on the activity 2-3 for a subject of
 i) O&M of tube well and pump facility

ii) leakage detection
 iii) O&M of sewer and storm water drainage
 iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage
 v) asset management for water supply and sewerage system

Note:

*1: The detail will be defined before the end of the project.

*2: The detail will be defined on 1st JCC.

*3: Training curriculum describes training course with schedule including training methods, tools, class room and field component and contact time and assessment requirement. Training material includes but not limited to lectures, class room discussions, case study, guest lecture, site visits, use of equipment and assessment of existing situations is used for training course and its approaches. Manual describes how to use equipment and report with its O&M frequency and improvement strategies.

Pump facility is located at tube well. Disposal station is the place for pumping up including all civil, electrical and mechanical devises and system sewage.

Version 0

Monitoring

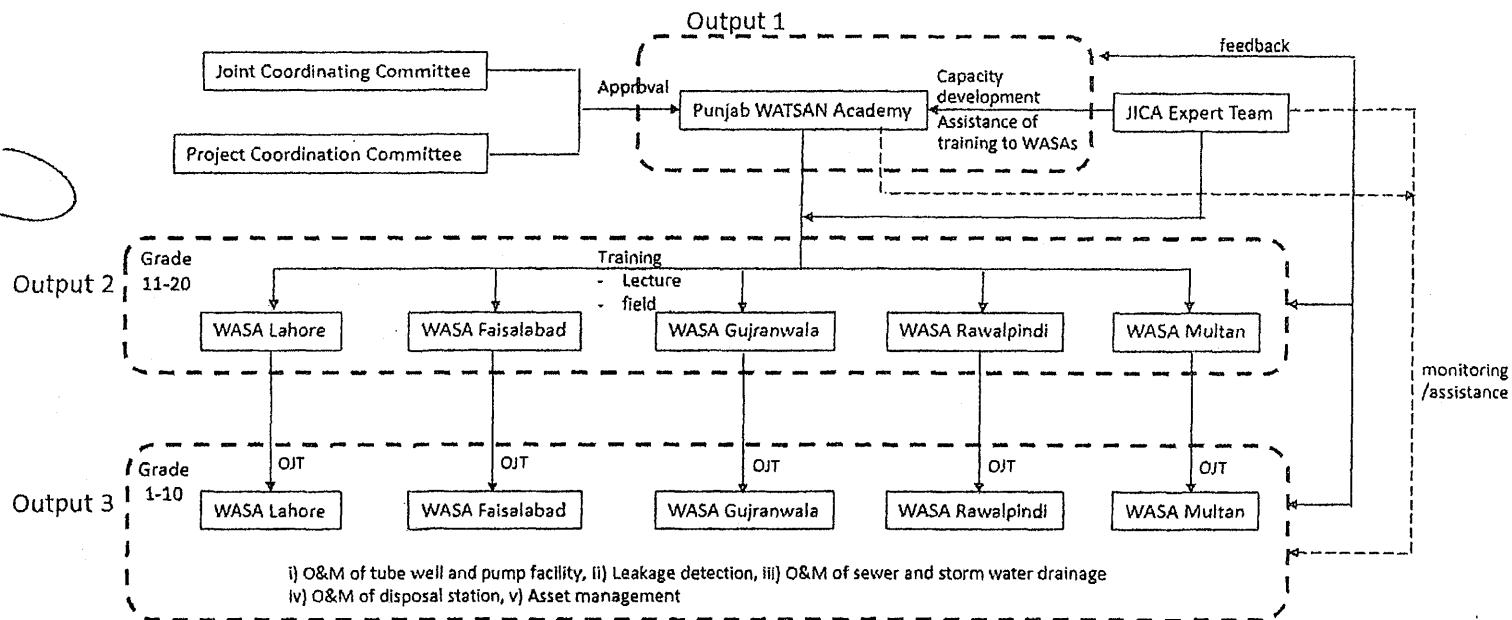
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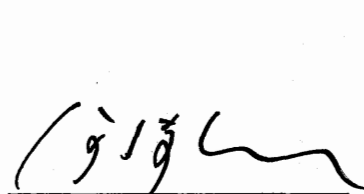
Annex 1.2
Record of Discussion

RECORD OF DISCUSSIONS
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
AUTHORITIES CONCERNED OF
THE ISLAMIC REPUBLIC OF PAKISTAN
ON
JAPANESE TECHNICAL COOPERATION
FOR
PROJECT FOR IMPROVING THE CAPACITY OF WASAs
IN PUNJAB PROVINCE

The Japan International Cooperation Agency (hereinafter referred to as "JICA"), through the Chief Representative of JICA Pakistan Office, exchanged the views and had a series of discussions with the related Pakistan authorities with respect to desirable measures to be taken by JICA and the Government of the Islamic Republic of Pakistan (hereinafter referred to as "Pakistan") for the successful implementation of the Project for Improving the Capacity of WASAs in Punjab Province (hereinafter referred to as "the Project").

As a result of the discussions, and in accordance with the provisions of the Agreement on Technical Cooperation between the Government of Japan and the Government of Pakistan, signed in Islamabad on April 30, 2005 (hereinafter referred to as "the Agreement"), JICA and Pakistan authorities concerned agreed on the matters referred to in the document attached hereto.

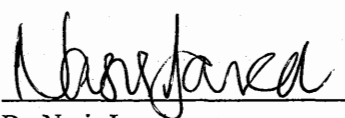
Lahore, March 31, 2015



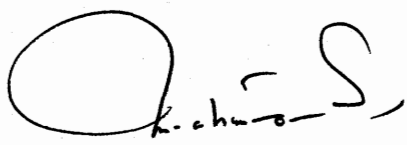
Mr. Mitsuyoshi Kawasaki
Chief Representative
JICA Pakistan Office




Mr. Asad Rehman Gillani
Secretary
Housing, Urban Development and
Public Health Engineering
Department,
Government of the Punjab



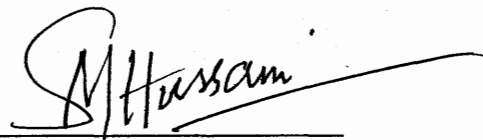
Dr. Nasir Javed
Chief Executive Officer
The Urban Sector Planning and
Management Services Unit Pvt.
Ltd (Urban Unit)
Planning and Development
Department,
Government of the Punjab



Mr. Ch. Naseer Ahmad
Managing Director
Water and Sanitation Agency
Lahore Development Authority



Dr. Aamer Ahmed
Secretary
Planning and Development
Department
Government of the Punjab



Mr. Syed Mujtaba Hussain
Joint Secretary (Economic Affairs)
Economic Affairs Division
Islamic Republic of Pakistan

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN JICA AND THE GOVERNMENT OF PAKISTAN

1. The Government of Pakistan and the Government of Punjab will implement the Project for Improving the Capacity of WASAs in Punjab Province (hereinafter referred to as "the Project") in cooperation with JICA.
2. The Project will be implemented in accordance with the Master Plan which is given in ANNEX I.

II. MEASURES TO BE TAKEN BY JICA

In accordance with the laws and regulations in force in Japan and provisions of Article III of the Agreement, JICA, as the executing agency for technical cooperation of the Government of Japan, will take, at its own expense, the following measures according to the normal procedures of its technical cooperation scheme.

1. DISPATCH OF JICA EXPERTS

JICA will provide the services of JICA Experts as listed in ANNEX II. The provision of Article VIII of the Agreement will be applied to the above-mentioned experts.

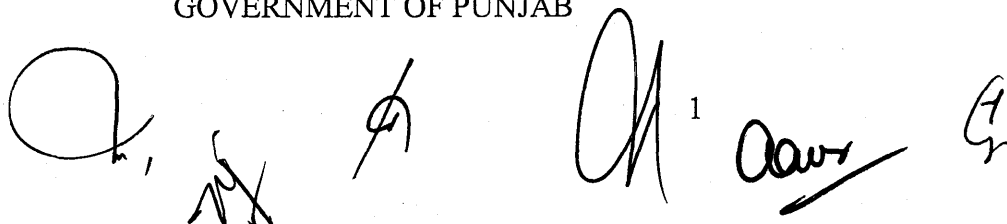
2. PROVISION OF EQUIPMENT

JICA will provide such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in ANNEX III. The provision of Article VII of the Agreement will be applied to the Equipment.

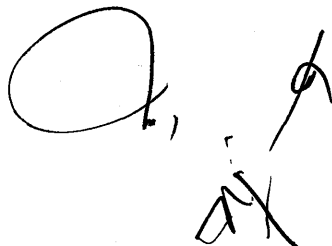
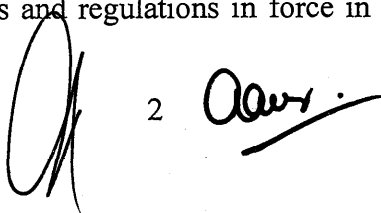

3. TRAINING OF PAKISTANI PERSONNEL IN JAPAN

JICA will receive the Government of Pakistan personnel connected with the Project for technical training in Japan.

III. MEASURES TO BE TAKEN BY THE GOVERNMENT OF PAKISTAN AND THE GOVERNMENT OF PUNJAB

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1. The Government of Pakistan and the Government of Punjab will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.
2. The Government of Pakistan and the Government of Punjab will ensure that the technologies and knowledge acquired by the Pakistan nationals as a result of Japanese technical cooperation will contribute to the economic and social development of Pakistan.
3. In accordance with the provision of Article V of the Agreement, the Government of Pakistan and the Government of Punjab will grant in Pakistan privileges, exemptions and benefits to the JICA Experts referred to in II-1 above and their families.
4. In accordance with the provision of Article VII of the Agreement, The Government of Pakistan and the Government of Punjab will take the measures necessary to receive and use the Equipment provided by JICA referred to in II-2 above and equipment, machinery and materials carried in by JICA Experts referred to in II-1 above.
5. The Government of Pakistan and the Government of Punjab will take necessary measures to ensure that the knowledge and experience acquired by the Pakistani personnel from technical training in Japan will be utilized effectively in the implementation of the Project.
6. In accordance with the provision of Article V-(2)-(b) of the Agreement, the Government of Pakistan and the Government of Punjab will provide the services of Pakistani counterpart personnel and administrative personnel as listed in ANNEX IV.
7. In accordance with the provision of Article V-(2)-(a) of the Agreement, the Government of Pakistan and the Government of Punjab will provide the buildings and facilities as listed in ANNEX V.
8. In accordance with the laws and regulations in force in Pakistan, the Government of

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Pakistan and the Government of Punjab will take necessary measures to supply or replace at its own expense machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided by JICA under II-2 above.

9. In accordance with the laws and regulations in force in Pakistan, the Government of Pakistan and the Government of Punjab will take necessary measures to meet the running expenses necessary for the implementation of the Project.
10. The Government of Pakistan and the Government of Punjab will take necessary measures to ensure security of Experts, the member of the missions the Representative, the Staff and their families staying in the Pakistan in accordance with the provision of Article X of the Agreement.

IV. ADMINISTRATION OF THE PROJECT

1. Secretary Housing, Urban Development and Public Health Engineering Department, Government of the Punjab (hereinafter referred to as "HUD&PHED"), as Chairman of the Joint Coordinating Committee of the Project, will bear overall responsibility for the coordination and oversight of the Project.
2. Deputy Managing Director Engineering, WASA Lahore, will be the Project Director Construction, and will be responsible for timely completion of the construction project as per revised PC-I (2014) and report to the Secretary (HUD&PHED).
3. Chief Executive Officer (hereinafter referred to as "CEO"), The Urban Sector Planning and Management Services Unit Pvt. Ltd (hereinafter referred to as "the Urban Unit"), as Project Director Management, will be responsible for management of the Punjab WATSAN Academy and report to the Secretary (HUD&PHED) and act as Secretary to Joint Coordinating Committee.
4. Principal of Punjab WATSAN Academy, as Project Manager, will be responsible for the implementation of training activities in Punjab WATSAN Academy and pilot activities in each WASA with their consultation and cooperation.

5. JICA Chief Advisor will provide necessary recommendations and advice to the Secretary (HUD&PHED), Project Director Management and Project Manager on any matters pertaining to the design and implementation of the Project as and when required.
6. JICA Experts will give comprehensive technical support, guidance and advice as per agreed Master Plan to Pakistani counterpart personnel on technical matters pertaining to the implementation of the Project.
7. For the effective and successful implementation of technical cooperation for the Project, a Joint Coordinating Committee and Project Coordination Committee will be established whose functions and composition are described in ANNEX VI and ANNEX VI.

V. CLAIMS AGAINST JICA EXPERTS

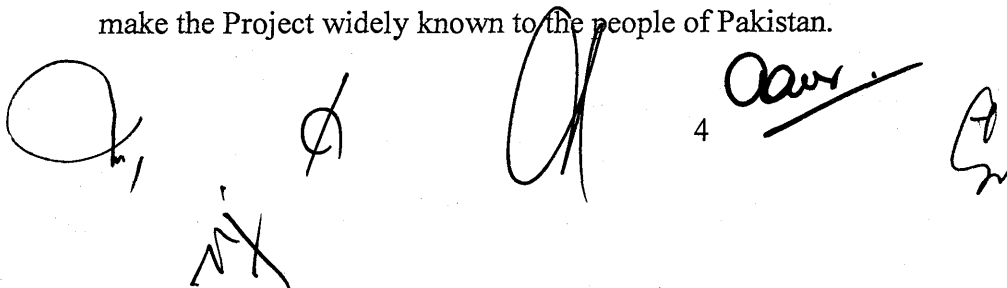
In accordance with the provision of Article VI of the Agreement, the Government of Pakistan and the Government of Punjab undertakes to bear claims, if any arises, against JICA Experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in Pakistan except for those arising from the willful misconduct or gross negligence of JICA Experts.

VI. MUTUAL CONSULTATION

There will be mutual consultation between JICA and the Government of Pakistan and the Government of Punjab on any major issues arising from, or in connection with this Attached Document.

VII. MEASURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT



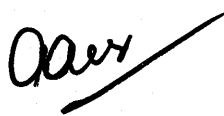
For the purpose of promoting support for the Project among the people of Pakistan, the Government of Pakistan and the Government of Punjab will take appropriate measures to make the Project widely known to the people of Pakistan.




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VIII. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be three (3) years from the date when the expert(s) arrives.

| | |
|------------|--|
| ANNEX I | MASTER PLAN |
| ANNEX II | LIST OF EXPERTS |
| ANNEX III | TENTATIVE LIST OF MACHINERY AND EQUIPMENT |
| ANNEX IV | LIST OF PAKISTANI COUNTERPART AND ADMINISTRATIVE PERSONNEL |
| ANNEX V | LIST OF BUILDING AND FACILITIES |
| ANNEX VI | JOINT COORDINATING COMMITTEE |
| ANNEX VII | PROJECT COORDINATION COMMITTEE |
| ANNEX VIII | IMPLEMENTATION STRUCTURE |
| ANNEX IX | PROJECT DESIGN MATRIX |
| ANNEX X | PLAN OF OPERATION |

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ANNEX I MASTER PLAN

1. Title of the Project

The project for Improving the Capacity of WASAs in Punjab Province

2. Overall goal

Water supply and sewerage service in WASAs is improved.

3. Project purpose

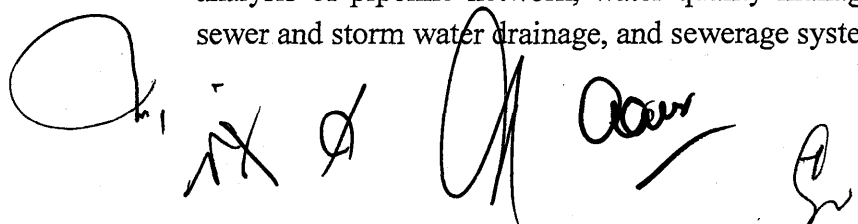
Punjab WATSAN Academy is functioned as a training institute for capacity development of staff of WASAs and the public water sector.

4. Outputs

- (1) Training system of Punjab WATSAN Academy including manuals, training curriculum and standards, training material and aid and annual training plan, job promotion and confirmation system and OJT system with assessment methods is established.
- (2) The faculties at Punjab WATSAN Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management.
- (3) OJT is implemented by trainees of WASAs trained at Punjab WATSAN Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management.

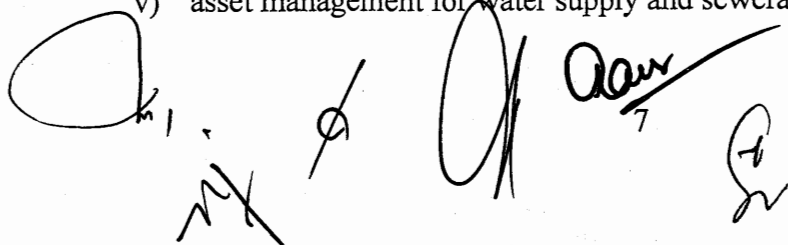
5. Activities

- 1-1. To review and update Master Plan of Project and management plan including budget, facility, personnel and organization system, and provide recommendation if necessary.
- 1-2. To grasp needs for training of WASAs.
- 1-3. To assess capacities at WASAs for
 - i) O&M on tube well and pump facility
 - ii) leakage detection and repair
 - iii) O&M of sewer and storm water drainage
 - iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage
 - v) Management of assets and operational and business planning
- 1-4. To develop capacity of training framework, curriculum, training material and training aid and standards with assessment methods related to
 - i) basic knowledge and skills on water and sewerage system utilities business management including reporting SOP, planning and design of water supply including network zoning and sewer/storm water drainage including hydraulic analysis of pipeline network, water quality management and water safety plan, sewer and storm water drainage, and sewerage system management.

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- ii) professional knowledge and skills on
 - a) O&M of tube well and pump facility
 - b) leakage detection and repair
 - c) O&M of sewer and storm water drainage including safety precaution and Health and Safety Environment
 - d) O&M of disposal station.
 - e) asset management for water supply and sewerage system.
 - f) reporting and compliance
- 1-5. To formulate annual training implementation plan including OJT system and Plan.
- 1-6. To train Punjab WATSAN Academy staff to acquire capacity of training delivery and coordination as per Master Plan.
- 1-7. To train Punjab WATSAN Academy staff to acquire teaching and pedagogical skills.
- 1-8. To establish evaluation and testing mechanism for training course and Punjab WATSAN Academy staff for quality assurance.
- 1-9. To revise manual, training curriculum and training material for improving training course at Punjab WATSAN Academy and OJT facilities.
- 1-10. To develop and establish the comprehensive procedure, standards, curriculum and training needs and material with assessment methods of Output 3.

- 2-1. To conduct training course(s) for basic knowledge and Skills.
- 2-2. To conduct training course(s) for a subject of
 - i) O&M of tube well and pump facility
 - ii) leakage detection and repair
 - iii) O&M of sewer and storm water drainage including safety and precaution
 - iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage
 - v) asset management for water supply and sewerage system
- 2-3. To prepare and Implement an OJT plan for a subject of
 - i) O&M of tube well and pump facility
 - ii) leakage detection and repair
 - iii) O&M of sewer and storm water drainage including safety precaution
 - iv) O&M of disposal station
 - v) asset management for water supply and sewerage system
- 2-4. To conduct regular training course(s) updated contents through previous training and OJT activities for a subject of
 - i) O&M of tube well and pump facility
 - ii) leakage detection
 - iii) O&M of sewer and storm water drainage including safety precaution and Health and Safety Environment
 - iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage
 - v) asset management for water supply and sewerage system

The bottom of the page features several handwritten signatures and initials in black ink. From left to right, there is a large, stylized signature, a smaller signature, a signature with a large loop, a signature that appears to be 'Aam' with a horizontal line through it, and a final signature that looks like 'Sv'.

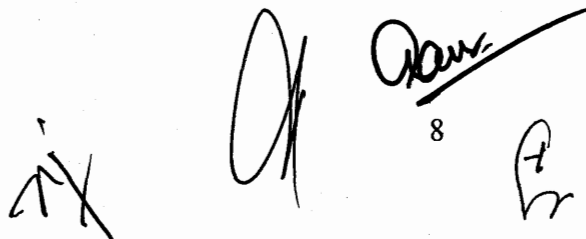
3-1 To conduct OJT to WASA's workers by the trainees at Punjab WATSAN Academy as planned on the activity 2-3 for a subject of

- i) O&M of tube well and pump facility
- ii) leakage detection
- iii) O&M of sewer and storm water drainage including safety precaution and Health and Safety Environment
- iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage
- v) asset management for water supply and sewerage system

Note:

Training curriculum describes training course with schedule including training methods, tools, class room and field component and contact time and assessment requirement with standards confirming minimum requirement of Pakistan Engineering Council and National Vocational and Technical Training Commission (NVTTC) Pakistan . Training material includes but not limited to lectures, class room discussions, case study, guest lecture, site visits, use of equipment and assessment of existing situations is used for training course and its approaches. Manual describes how to use equipment and report with its O&M frequency and improvement strategies.

Pump facility is located at tube well. Disposal station is the place for pumping up including all civil, electrical and mechanical devises and system sewage.

A large handwritten 'Q' followed by a handwritten symbol that looks like a circle with a diagonal line through it.Four handwritten signatures or initials are present. The first is a stylized 'ix'. The second is a large 'Q' with a diagonal line. The third is a signature that appears to be 'Qam'. Below it is the number '8'. The fourth is a signature that appears to be 'Fr'.

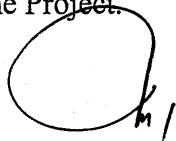
ANNEX II LIST OF JICA EXPERTS

- Fields of Experts

- 1) Chief advisor/ training management/O&M of water sector
- 2) Leak detection
- 3) O&M of Water supply facilities including Mechanical and electrical equipment
- 4) O&M of Drainage and Sewerage
- 5) Water utilities business management including asset management and planning
- 6) Curriculum development and Assessment
- 7) Training Skill for OJT

Note:

JICA Experts will be added as the need arises for the smooth and effective implementation of the Project.



ANNEX III TENTATIVE LIST OF MACHINERY AND EQUIPMENT

| | Year | 2014 |
|-----|--|-------|
| | Items of Equipment | Total |
| 1 | Equipment for Common use in Punjab WATSAN Academy | |
| | a) Laptop PC for faculty staff | 16 |
| | b) Projector and screen for lecture | 5 |
| | c) Necessary number of UPS for d) to g) | - |
| 2 | Equipment for training | |
| 2-1 | Equipment for water supply tube well and pump facility | |
| | a) Portable ultrasonic-flow meter including pressure gauge | 7 |
| 2-2 | Equipment for leak detection | |
| | a) Metal locator | 8 |
| | b) Non-metallic pipe locator | 8 |
| | c) Acoustic leak detector | 8 |
| | d) Acoustic bar | 8 |
| | e) Metal pipe locator | 8 |
| | f) Distance meter | 8 |
| | g) Pressure recorder | 6 |
| 2-3 | Equipment for safety precaution | |
| | a) Multi Gas (CO, H ₂ S, CH ₄ , O ₂) meter | 12 |

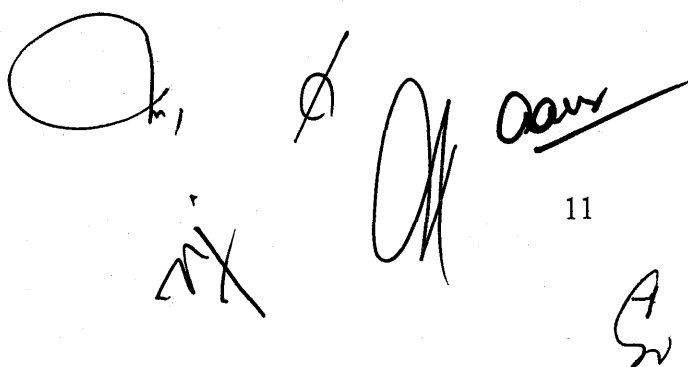
Note: If JICA can justify the necessity of 1 a) and b) JICA will provide necessary equipment.

ANNEX IV LIST OF PAKISTANI COUNTERPART AND ADMINISTRATIVE PERSONNEL

| No | Project Position | Position | Organization |
|----|---|--------------------------------------|---|
| 1 | Chairman | Secretary | Housing, Urban Development and Public Health Engineering Department, Government of the Punjab |
| 2 | Project Director Construction | Deputy Managing Director Engineering | WASA Lahore |
| 3 | Project Director Management | CEO | the Urban Unit (through an agreement) |
| 4 | Project Manager | Principal | Punjab WATSAN Academy |
| 5 | Administration | Manager | Finance and Admin, Punjab WATSAN Academy |
| 6 | OJT Manager in Lahore | Managing Director | WASA Lahore |
| 7 | OJT Manager in Faisalabad | Managing Director | WASA Faisalabad |
| 8 | OJT Manager in Rawalpindi | Managing Director | WASA Rawalpindi |
| 9 | OJT Manager in Gujranwala | Managing Director | WASA Gujranwala |
| 10 | OJT Manager in Multan | Managing Director | WASA Multan |
| 11 | Water supply specialist | Faculty | Water supply ,Punjab WATSAN Academy |
| 12 | Sewerage and waste water treatment Specialist | Faculty | Drainage and Sewerage, Punjab WATSAN Academy |
| 13 | Curriculum and Instruction design specialist | Faculty | Curriculum Development, Punjab WATSAN Academy |
| 14 | Technical skill based training specialist | Faculty | Training Specialist, Punjab WATSAN Academy |
| 15 | Instructors | Faculty | Training Faculty, Punjab WATSAN Academy |

Note:

Counterpart personnel will be added as the need arises for the smooth and effective implementation of the Project.






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ANNEX V LIST OF BUILDING AND FACILITIES

Pakistani side will arrange the following items.

1. Furnished and air-conditioned office spaces in Punjab WATSAN Academy, which can accommodate 10 persons.
2. Facilities such as desks, chairs, book shelves, internet access and telephones, etc. necessary for the Project activities.
3. Rooms and spaces necessary for installation and storage of the Equipment
4. Other facilities mutually agreed upon as necessary



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ANNEX VI JOINT COORDINATING COMMITTEE

1. Functions

A Joint Coordinating Committee will be organized and notified. The committee meeting will be held at least once a year and whenever need arises.

The functions of the Committee are as follows.

- 1) To supervise the annual work plan of the Project in line with the Plan of Operations.
- 2) To review the annual and overall progress of the Project and to evaluate the accomplishment of the annual targets and achievement of the objectives.
- 3) To identify proper ways and means for solution of the major issues arising from or in connection with the Project.

2. Composition

1) Chairperson:

Secretary Housing, Urban Development and Public Health Engineering Department

2) Members of Pakistani side:

Representative of Planning and Development Department, Government of the Punjab

(Not less than Grade 19 officers)

CEO the Urban Unit, Planning and Development Department (Secretary of JCC)

Senior Water and Sanitation Specialist Urban Unit, Planning and Development Department

Principal, Punjab WATSAN Academy

Managing Director WASA Lahore

Managing Director WASA Faisalabad

Managing Director WASA Rawalpindi

Managing Director WASA Multan

Managing Director WASA Gujranwala

Other personnel concerned, to be assigned by Chairperson of JCC, if necessary

3) Members of the Japanese Side:

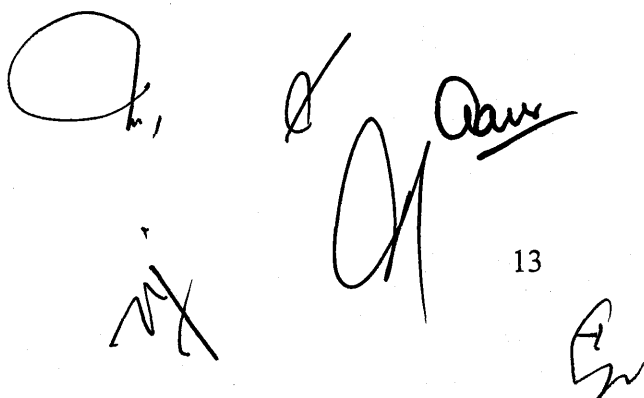
Representative of JICA

JICA Experts

Other personnel concerned, to be assigned by JICA, if necessary

Note:

Official(s) of the Economic Affairs Division and the Embassy of Japan in Pakistan may attend as observer(s).



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ANNEX VII PROJECT COORDINATION COMMITTEE (PCC)

1. Functions

The Planning and Coordination of the Training Punjab WATSAN Academy will be notified by Secretary HUD&PHED

The functions of the Committee are as follows.

- 1) Approve Training Program and its Framework
- 2) Establish overall policy and procedures for the development and maintenance of each of the professional programs.
- 3) Develop, review and update the standards for individual course approval for each professional program.
- 4) Review and approve courses for inclusion in the Catalog of Approved Courses for each professional program on a quarterly basis.
- 5) Propose fees for departments /individual from Public and Private sectors
- 6) Notify Essential Requirement at each stage of the staff career
- 7) Establish and monitor filed support system for WASA staff
- 8) Performance Review of Principle and Core Faculty
- 9) Approval of budget and audit reports
- 10) Approval of Rules of Business

2. Composition

1) Chairperson:

CEO Urban Unit (Chairperson)

2) Members of Pakistani side:

MD WASA Lahore


Principal of the Punjab WATSAN Academy (Secretary)

Representative from HUD/PHED

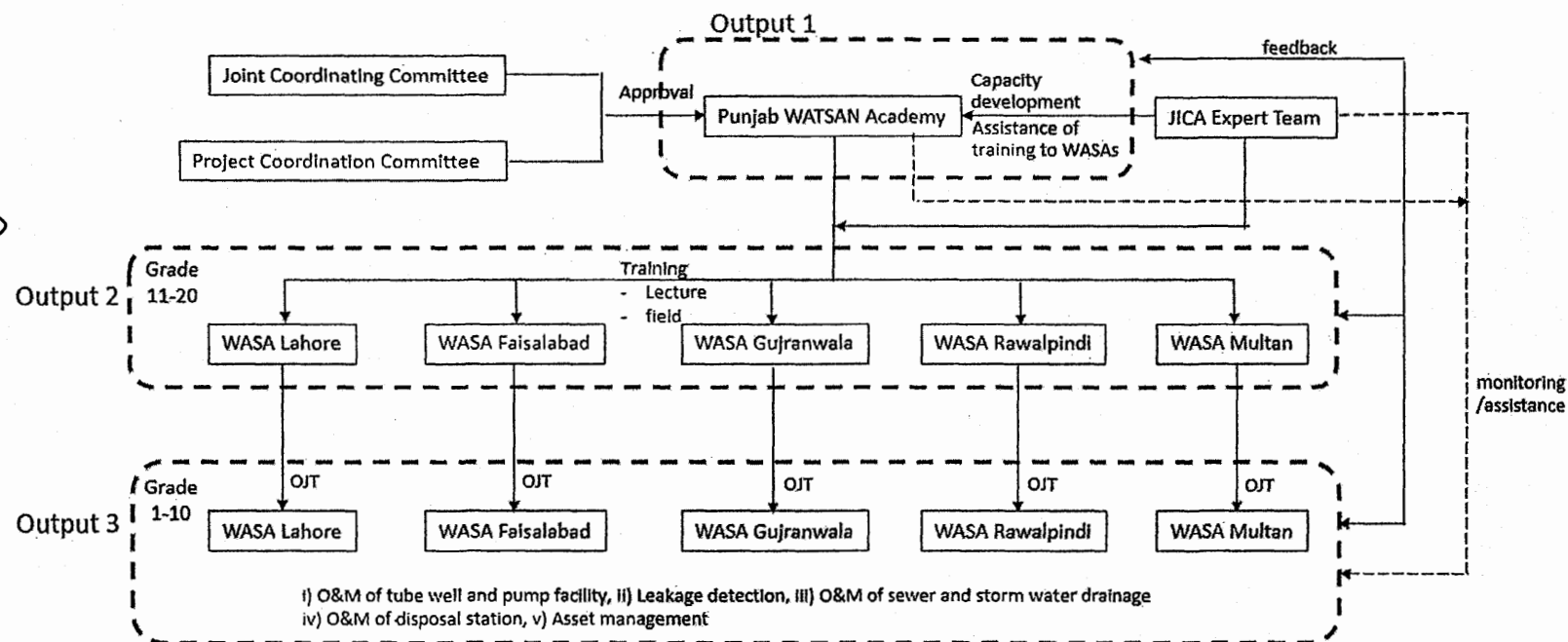
Representative from Planning and Development Department, Government of the Punjab

3) Members of the Japanese Side:

JICA Chief Advisor of the Project



ANNEX VIII IMPLEMENTATION STRUCTURE



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ANNEX IX PROJECT DESIGN MATRIX

Project Design Matrix

Project Title: Project for Improving the Capacity of WASAs in Punjab Province**Implementing Agency:** HUD/PHED, Urban Unit**Target Group:** (Direct) The faculty of Punjab WATSAN academy and staff of 5 WASAs

(Indirect) Residents of 5 cities and staff of public water sector in Punjab

Period of Project: 2015-2017 (3 years)**Project Site:** City of Lahore, Rawalpindi, Gujranwala, Faisalabad and Multan

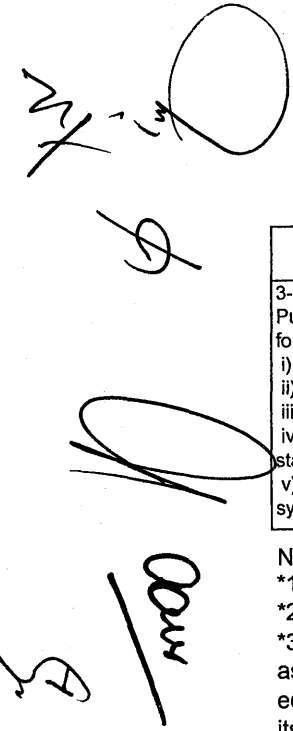
Version 0

Dated Feb, 2015

| Narrative Summary | Objectively Verifiable Indicators | Means of Verification | Important Assumption | Achievement | Remarks |
|--|---|--|--|-------------|---------|
| Overall Goal Water supply and sewerage service in 5 WASAs is improved. | 1 The target of the performance indicators on management and O&M are achieved. ^{*1} | 1 Statistical / annual report/Bench making report of WASAs | | | |
| Project Purpose Punjab WATSAN Academy is functioned as a training institute for capacity development of staff of WASAs and the public water sector. | 1 1 Training courses are conducted based of the plan which is formulated in Output 1 2 Performance indicators related to management and O&M are improved. ^{*2} | 1 Training records 2 Performance indicator records of WASAs | | | |
| Outputs 1.Training system of Punjab WATSAN Academy including manuals, training curriculum and standards, training material and aid and annual training plan, job promotion and confirmation system and OJT system with assessment methods is established. 2. The faculties at Punjab WATSAN Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management. 3. OJT is implemented by trainees of WASAs trained at Punjab WATSAN Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management. | 1-1 Training curriculum and training material/manual are developed for tube well and pump facility, leakage detection, sewer and storm water drainage, ^{*4} disposal station, and asset management. 1-2 Evaluation mechanism for training course and WATSAN Academy staff is established. 1-3 Training curriculum and training material/manual are revised regularly. 1-4 Annual training plan is made every year. 2-1 Regular training course(s) is conducted by Punjab WATSAN Academy staff. 2-2 More than 80 % of trainees participating in the training courses complete the course with the requirement including pass the level 3-1 The following OJT activities are implemented with an application of the obtained knowledge and technique at Punjab WATSAN Academy. i) O&M of tube well and pump facility ii) leakage detection iii) O&M of sewer and storm water drainage iv) O&M of disposal station v) asset management | 1-1 Training curriculum and training material/manual ^{*3} 1-2 Evaluation report 1-3 Revised manual, training curriculum and training material 1-4 Annual training plan 2-1 Training records 2-2 Records of level check test 3-1 OJT records | 1. Trained Punjab WATSAN Academy staffs do not leave Punjab WATSAN Academy | | |

| Narrative Summary | Objectively Verifiable Indicators | Means of Verification | Important Assumption | Achievement | Remarks |
|--|--|--|---|-------------|---------|
| Activities | Inputs | | Pre-Conditions | | |
| | The Japanese Side | The Pakistan Side | | | |
| <p>1-1 To review and update Master Plan of Project and management plan including budget, facility, personnel and organization system, and provide recommendation if necessary.</p> <p>1-2 To grasp needs for training of WASAs.</p> <p>1-3 To assess capacities at WASAs for</p> <p>i) O&M on tube well and pump facility</p> <p>ii) leakage detection</p> <p>iii) O&M of sewer and storm water drainage</p> <p>iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage</p> <p>v) Management of assets and operational and business planning</p> <p>1-4 To develop capacity building for a training framework, curriculum, training material and training aid and standards with assessment methods related to</p> <p>i) basic knowledge and skills on water and sewerage business management including reporting Standard Operating Procedure, planning and design of water supply and sewer/storm water drainage including hydraulic analysis of pipeline network, water quality management and water safety plan, sewer and storm water drainage,</p> <p>ii) professional knowledge and skills on</p> <p>a) O&M of tube well and pump facility</p> <p>b) leakage detection and management</p> <p>c) O&M of sewer and storm water drainage including safety precaution and Health Safety and Environment</p> <p>d) O&M of disposal station.</p> <p>e) asset management for water supply and sewerage system.</p> <p>f) reporting and compliance</p> <p>1-5 To formulate annual training implementation plan including OJT system and Plan .</p> <p>1-6 To train Punjab WATSAN Academy staff to acquire capacity of delivery and coordination as per Master Plan.</p> <p>1-7 To train Punjab WATSAN Academy staff to acquire teaching and pedagogical skills.</p> <p>1-8 To establish evaluation and testing mechanism for training course and Punjab WATSAN Academy staff for quality assurance.</p> | <p>1. Expert</p> <p>1) Chief advisor/ training management/O&M of water sector</p> <p>2) Leak detection</p> <p>3) O&M of Water supply facilities including Mechanical and electrical equipment</p> <p>4) O&M of Drainage and Sewerage</p> <p>5) Water utilities business management including asset management and planning</p> <p>6) Curriculum development and Assessment</p> <p>7) Training skill for OJT</p> <p>2. Equipment</p> <p>1) Equipment for O&M of water supply tube well and pump facilities</p> <p>2) Equipment of leak detection</p> <p>3) Equipment for safety precaution</p> <p>3. Training in Japan</p> <p>- Counterpart trainees from Punjab WATSAN Academy and WASAs</p> | <p>1. Counterpart personnel</p> <p>2. Office space and facilities</p> <p>3. Necessary data/ information</p> <p>4. Local cost</p> <p>5. Suitable security arrangement and advice</p> <p>6. - Alteration/renovation works</p> <p>- Electric Works</p> <p>- Services (Water supply and sewage)</p> <p>- Purchase of Furniture and Fixtures</p> <p>- Equipment and Machinery</p> <p>- Vehicles</p> <p>- Salaries for Punjab WATSAN Academy staff</p> <p>- Operation and Maintenance Cost (Other than salaries)</p> | <p>[Pre-conditions]</p> <p>1. To be approved PC-1 by the Planning Commission (CDWP)</p> <p>2. To employ Punjab WATSAN Academy staffs</p> <p>3. To prepare management plan of Punjab WATSAN Academy including budget, facility, personnel and organization system</p> <p>↓</p> <p><Issues and countermeasures></p> | | |

| Narrative Summary | Objectively Verifiable Indicators | Means of Verification | Important Assumption | Achievement | Remarks |
|---|-----------------------------------|-----------------------|----------------------|-------------|---------|
| <p>1-9 To revise manual, training curriculum and training material for improving training course at Punjab WATSAN Academy and OJT facilities.</p> <p>1-10 To develop and establish the comprehensive procedure, standards, curriculum and training needs and material with assessment methods of Output 3.</p> <p>2-1 To conduct training course(s) for basic knowledge and Skills.</p> <p>2-2 To conduct training course(s) for a subject of</p> <ul style="list-style-type: none"> i) O&M of tube well and pump facility ii) leakage detection iii) O&M of sewer and storm water drainage including safety precaution iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage v) asset management for water supply and sewerage system. vi) management of assets and operational and business planning <p>2-3 To prepare and implement an OJT plan for a subject of</p> <ul style="list-style-type: none"> i) O&M of tube well and pump facility ii) leakage detection iii) O&M of sewer and storm water drainage including safety precaution iv) O&M of disposal station v) asset management for water supply and sewerage system. <p>2-4 To conduct regular training course(s) updated contents through previous training and OJT activities for a subject of</p> <ul style="list-style-type: none"> i) O&M of tube well and pump facility ii) leakage detection iii) O&M of sewer and storm water drainage including safety precaution iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage v) asset management for water supply and sewerage system. | | | | | |



| Narrative Summary | Objectively Verifiable Indicators | Means of Verification | Important Assumption | Achievement | Remarks |
|--|-----------------------------------|-----------------------|----------------------|-------------|---------|
| 3-1 To conduct OJT to WASA's workers by the trainees at Punjab WATSAN Academy as planned on the activity 2-3 for a subject of i) O&M of tube well and pump facility ii) leakage detection iii) O&M of sewer and storm water drainage iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage v) asset management for water supply and sewerage system | | | | | |

Note:

*1: The detail will be defined before the end of the project.

*2: The detail will be defined on 1st JCC.

*3: Training curriculum describes training course with schedule including training methods, tools, class room and field component and contact time and assessment requirement. Training material includes but not limited to lectures, class room discussions, case study, guest lecture, site visits, use of equipment and assessment of existing situations is used for training course and its approaches. Manual describes how to use equipment and report with its O&M frequency and improvement strategies.

*4: Pump facility is located at tube well. Disposal station is the place for pumping up including all civil, electrical and mechanical devises and system

Tentative Plan of Operation

ANNEX X PLAN OF OPERATION

Version 0

Dated Feb, 2015

Project Title: Project for Improving the Capacity of WASAs in Punjab Province

Monitoring

| Inputs | Year | 1st Year | | | | 2nd Year | | | | 3rd Year | | | | Remarks | Issue | Solution |
|--|--------|----------|----|-----|----|----------|----|-----|----|----------|----|-----|----|---------|-------|----------|
| | | I | II | III | IV | I | II | III | IV | I | II | III | IV | | | |
| Expert | | | | | | | | | | | | | | | | |
| Chief advisor/ training management/O&M of water sector | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Leak detection | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| O&M of Water supply facilities including Mechanical and electrical equipment | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| O&M of Drainage and Sewerage | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Water utilities business management including asset management and planning | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Curriculum development and Assessment | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Training skills for OJT | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Equipment | | | | | | | | | | | | | | | | |
| Equipment for Punjab WATSAN Academy | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Equipment for O&M of water supply tube well and pump facilities in output 3 | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Equipment for measurement of NRW in output 4 | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Equipment of leak detection in output 4 | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Equipment for safety precaution in output 5 | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Equipment for GIS in output 7 | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Training in Japan | | | | | | | | | | | | | | | | |
| Counterpart training for Output 1 | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Counterpart training for Output 2 | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| In-country/Third country Training | | | | | | | | | | | | | | | | |
| | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |

| Activities | Sub-Activities | | | | | Year | 1st Year | | | | 2nd Year | | | | 3rd Year | | | | Responsible Organization | | Achievements | Issue & Countermeasures |
|--|----------------|--|--|--|--|--------|----------|----|-----|----|----------|----|-----|----|----------|----|-----|----|--------------------------|----------|--------------|-------------------------|
| | | | | | | | I | II | III | IV | I | II | III | IV | I | II | III | IV | Japan | Pakistan | | |
| Output 1: Training system of Punjab WATSAN Academy including manuals, training curriculum and standards, training material and aid and annual training plan, job promotion and confirmation system and OJT system with assessment methods is established. | | | | | | | | | | | | | | | | | | | | | | |
| 1-1 To review and update Master Plan of Project and management plan including budget, facility, personnel and organization system, and provide recommendation if necessary. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| 1-2 To grasp needs for training of WASAs. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| 1-3 To assess capacities at WASAs for | | | | | | | | | | | | | | | | | | | | | | |
| i) O&M on tube well and pump facility | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| ii) leakage detection | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| iii) O&M of sewer and storm water drainage | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| v) Management of assets and operational and business planning | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| 1-4 To develop capacity building a training framework, curriculum, training material and training aid and standards with assessment methods related to | | | | | | | | | | | | | | | | | | | | | | |
| i) basic knowledge and skills on water and sewerage system utilities business management including reporting SOP, planning and design of water supply and sewer/storm water drainage including hydraulic analysis of pipeline network, water quality management and water safety plan, sewer and storm water drainage, and sewerage system management. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| ii) professional knowledge and skills on | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| a) O&M of tube well and pump facility | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| b) leakage detection and management | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| c) O&M of sewer and storm water drainage including safety precaution and Health and Safety Executive | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| d) O&M of disposal station. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| e) asset management for water supply and sewerage system. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| f) reporting and compliance | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| 1-5 To formulate annual training implementation plan including OJT system and Plan. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| 1-6 To train Punjab WATSAN Academy staff to acquire capacity of training delivery and coordination as per Master Plan. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| 1-7 To train Punjab WATSAN Academy staff to acquire teaching and pedagogical skills. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| 1-8 To establish evaluation and testing mechanism for training course and Punjab WATSAN Academy staff for quality assurance. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| 1-9 To revise manual, training curriculum and training material for improving training course at Punjab WATSAN Academy and OJT facilities. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |
| 1-10 To develop and establish comprehensive procedure, standards, curriculum and training needs and material with assessment methods of Output 3. | | | | | | Plan | | | | | | | | | | | | | | | | |
| | | | | | | Actual | | | | | | | | | | | | | | | | |

| Activities | Year | 1st Year | | | | 2nd Year | | | | 3rd Year | | | | Responsible Organization | | Achievements | Issue & Countermeasures |
|--|--------|----------|----|-----|----|----------|----|-----|----|----------|----|-----|----|--------------------------|----------|--------------|-------------------------|
| | | I | II | III | IV | I | II | III | IV | I | II | III | IV | Japan | Pakistan | | |
| Output 2: The faculties at Punjab WATSAN Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management. | | | | | | | | | | | | | | | | | |
| 2-1 To conduct training course(s) for basic knowledge and skills. | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| 2-2 To conduct training course(s) for a subject of | | | | | | | | | | | | | | | | | |
| i) O&M of tube well and pump facility | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| ii) leakage detection | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| iii) O&M of sewer and storm water drainage including safety precaution | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| v) asset management for water supply and sewerage system. | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| vi) management of assets and operational and business planning | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| 2-3 To prepare implement an OJT plan for a subject of | | | | | | | | | | | | | | | | | |
| i) O&M of tube well and pump facility | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| ii) leakage detection | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| iii) O&M of sewer and storm water drainage including safety precaution | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| iv) O&M of disposal station | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| v) asset management for water supply and sewerage system. | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| 2-4 To conduct regular training course(s) updated contents through previous training and OJT activities for a subject of | | | | | | | | | | | | | | | | | |
| i) O&M of tube well and pump facility | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| ii) leakage detection | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| iii) O&M of sewer and storm water drainage including safety precaution | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |
| v) asset management for water supply and sewerage system | Plan | | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | | |

| Activities | Sub-Activities | | | | | 1st Year | | | | 2nd Year | | | | 3rd Year | | | | Responsible Organization | | Achievements | Issue & Countermeasures |
|---|----------------|--|--|--|--|----------|----|-----|----|----------|----|-----|----|----------|----|-----|----|--------------------------|----------|--------------|-------------------------|
| | | | | | | I | II | III | IV | I | II | III | IV | I | II | III | IV | Japan | Pakistan | | |
| Output 3: OJT is implemented by trainees of WASAs trained at Punjab WATSAN Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management. | | | | | | | | | | | | | | | | | | | | | |
| 3-1 To conduct OJT to WASA's workers by the trainees at Punjab WATSAN Academy as planned on the activity 2-3 for a subject of | | | | | | | | | | | | | | | | | | | | | |
| i) O&M of tube well and pump facility | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| ii) leakage detection | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| iii) O&M of sewer and storm water drainage | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| v) asset management for water supply and sewerage system | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |

| Duration / Phasing | Plan | Actual | | | | | | | | | | | | | | | | |
|--------------------|------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|--------------------|------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

| Monitoring Plan | Year | 1st Year | | | | 2nd Year | | | | 3rd Year | | | | Remarks | Issue | Solution |
|---------------------------------------|--------|----------|----|-----|----|----------|----|-----|----|----------|----|-----|----|---------|-------|----------|
| | | I | II | III | IV | I | II | III | IV | I | II | III | IV | | | |
| Monitoring | | | | | | | | | | | | | | | | |
| Joint Coordination Committee | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Set-up the Detailed Plan of Operation | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Submission of Monitoring Sheet | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Monitoring Mission from Japan | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Joint Monitoring | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Post Monitoring | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Reports/Documents | | | | | | | | | | | | | | | | |
| Project Progress Report | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Project Completion Report | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| Public Relations | | | | | | | | | | | | | | | | |
| | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |
| | Plan | | | | | | | | | | | | | | | |
| | Actual | | | | | | | | | | | | | | | |


Annex 1.3
PDM (Project Design Matrix)

Project Design Matrix

Project Title: Project for Improving the Capacity of WASAs in Punjab Province**Implementing Agency:** HUD/PHED, Urban Unit**Target Group: (Direct)** The faculty of Al-Jazari academy and staff of 5 WASAs**(Indirect)** Residents of 5 cities and staff of public water sector in Punjab**Period of Project:** 2015-2018 (3 years)**Project Site:** City of Lahore, Rawalpindi, Gujranwala, Faisalabad and MultanVersion 1Dated September 22, 2015

| Narrative Summary | Objectively Verifiable Indicators | Means of Verification | Important Assumption | Achievement | Remarks |
|--|---|---|--|--|---------|
| Overall Goal | | | | | |
| Water supply and sewerage service in 5 WASAs is improved. | 1 The target of the performance indicators on management and O&M are achieved.* ¹ | 1 Statistical / annual report/Bench making report of WASAs | | | |
| Project Purpose | | | | | |
| Al-Jazari Academy is functioned as a training institute for capacity development of staff of WASAs and the public water sector (PHED, TMAs). | 1 Training courses are conducted as planned. 2 Performance indicators related to management and O&M are improved.* ² | 1 Training records 2 Performance indicator records of WASAs | | 1: 100% 2: 80% | |
| Outputs | | | | | |
| 1. Training system of Al-Jazari Academy is established. | 1-1 Training curriculum and training material/manual are developed for tube well and pump facility, leakage detection, sewer and storm water drainage, disposal station, and asset management. 1-2 Evaluation mechanism for training course and Al-Jazari Academy staff is established. 1-3 Training curriculum and training material/manual are revised regularly. 1-4 Annual training plan is made every year. | 1-1 Training curriculum and training material/manual* ³ 1-2 Evaluation report 1-3 Revised manual, training curriculum and training 1-4 Annual training plan | 1. Trained Al-Jazari Academy staffs do not leave Al-Jazari Academy | 1-1: 100% 1-2: 100% 1-3: 100% 1-4: 100% | |

| | | | | | |
|--|--|---|--|--|--|
| 2. The faculties at Al-Jazari Academy provide the training to staff of WASAs and the public water sector (PHED, TMAs) for improving the water supply and sewerage system and its management. | 2-1 Regular training course(s) is conducted by Al-Jazari Academy staff. 2-2 More than 80 % of trainees participating in the training courses pass the level check test. | 2-1 Training records 2-2 Records of level check test | 2-1: 100% 2-2: 100% 3-1: 85% | | |
| 3. OJT is implemented by trainees of WASAs trained at Al-Jazari Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management. | 3-1 The following OJT activities are implemented with an application of the obtained knowledge and technique at Al-Jazari Academy. i) O&M of tube well and pump facility ii) leakage detection iii) O&M of sewer and storm water drainage iv) O&M of disposal station v) asset management | 3-1 OJT records | | | |

| Activities | Inputs | | Pre-Conditions |
|---|--|---|--|
| | The Japanese Side | The Pakistan Side | |
| <p>1-1 To review Master Plan of Project and management plan including budget, facility, personnel and organization system, and provide recommendation if necessary.</p> <p>1-2 To grasp needs for training of WASAs.</p> <p>1-3 To assess capacities at WASAs for</p> <p>i) O&M on tube well and pump facility</p> <p>ii) leakage detection</p> <p>iii) O&M of sewer and storm water drainage</p> <p>iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage</p> <p>v) Management of assets and operational and business planning</p> <p>1-4 To develop capacity building a training framework, curriculum, training material and training aid related to</p> <p>i) basic knowledge and skills on water and sewerage business management including reporting Standard Operating Procedure, planning and design of water supply and sewer/storm water drainage including hydraulic analysis of pipeline network, water quality management and water safety plan, sewer and storm water drainage, and sewerage system management.</p> | <p>1. Expert</p> <p>1) Chief advisor/ training management/O&M of water sector</p> <p>2) Leak detection</p> <p>3) O&M of Water supply facilities including Mechanical and electrical equipment</p> <p>4) O&M of Drainage and Sewerage</p> <p>5) Water utilities business management including asset management and planning</p> <p>6) Curriculum development and Assessment</p> <p>7) Training skill</p> <p>2. Equipment</p> <p>1) Equipment for O&M of water supply tube well and pump facilities</p> <p>2) Equipment of leak detection</p> <p>3) Equipment for safety precaution</p> <p>3. Training in Japan</p> <p>- Counterpart trainees from Al-Jazari Academy and WASAs</p> | <p>1. Counterpart personnel</p> <p>2. Office space and facilities</p> <p>3. Necessary data/ information</p> <p>4. Local cost</p> <p>5. Suitable security arrangement and advice</p> <p>6.- Alteration/renovation works</p> <p>- Electric Works</p> <p>- Services (Water supply and sewage)</p> <p>- Purchase of Furniture and Fixtures</p> <p>- Equipment and Machinery</p> <p>- Vehicles</p> <p>- Salaries for Al-Jazari Academy staff</p> <p>- Operation and Maintenance Cost (Other than salaries)</p> | <p>[Pre-conditions]</p> <p>1. To be approved PC-1 by the Planning Commission (CDWP)</p> <p>2. To employ Al-Jazari Academy staffs</p> <p>3. To prepare management plan of Al-Jazari Academy including budget, facility, personnel and organization system</p> <p style="text-align: center;"></p> <p style="text-align: center;"><Issues and countermeasures></p> |

| | | | |
|---|--|--|--|
| <p>ii) professional knowledge and skills on</p> <ul style="list-style-type: none">a) O&M of tube well and pump facilityb) leakage detection and managementc) O&M of sewer and storm water drainage including safety precaution and HSEd) O&M of disposal station.e) asset management for water supply and sewerage system.f) reporting and compliance <p>1-5 To formulate annual training implementation plan.</p> <p>1-6 To train Al-Jazari Academy staff to acquire capacity of training coordination.</p> <p>1-7 To train Al-Jazari Academy staff to acquire teaching and pedagogical skills.</p> <p>1-8 To establish evaluation and testing mechanism for training course and Al-Jazari Academy staff for quality assurance.</p> <p>1-9 To revise manual, training curriculum and training material for improving training course.</p> <p>1-10 To develop and establish the procedure of Output 3.</p> | | | |
|---|--|--|--|

| | | | | |
|---|--|--|--|--|
| <p>2-1 To conduct training course(s) for basic knowledge.</p> <p>2-2 To conduct training course(s) for a subject of</p> <ul style="list-style-type: none">i) O&M of tube well and pump facilityii) leakage detectioniii) O&M of sewer and storm water drainage including safety precautioniv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainagev) asset management for water supply and sewerage system.vi) management of assets and operational and business planning <p>2-3 To prepare an OJT plan for a subject of</p> <ul style="list-style-type: none">i) O&M of tube well and pump facilityii) leakage detectioniii) O&M of sewer and storm water drainage including safety precautioniv) O&M of disposal stationv) asset management for water supply and sewerage system. <p>2-4 To conduct regular training course(s) updated contents through previous training and OJT activities for a subject of</p> <ul style="list-style-type: none">i) O&M of tube well and pump facilityii) leakage detection | | | | |
|---|--|--|--|--|

| | | | |
|---|--|--|--|
| <p>iii) O&M of sewer and storm water drainage including safety precaution iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage v) asset management for water supply and sewerage system.</p> <p>3-1 To conduct OJT to WASA's workers by the trainees at Al-Jazari Academy as planned on the activity 2-3 for a subject of i) O&M of tube well and pump facility ii) leakage detection iii) O&M of sewer and storm water drainage iv) O&M of elect and mechanical equipment for disposal station, and sewerage and drainage v) asset management for water supply and sewerage system</p> | | | |
|---|--|--|--|

Note:

*1: The detail will be defined before the end of the project.

*2: The detail will be defined on JCC.

*3: Training curriculum describes training course with schedule including training methods, tools, class room and field component and contact time and assessment requirement . Training material includes but not limited to lectures, class room discussions, case study, guest lecture, site visits, use of equipment and assessment of existing situations is used for training course and its approaches. Manual describes how to use equipment and report with its O&M frequency and improvement strategies.

Pump facility is located at tube well. Disposal station is the place for pumping up including all civil, electrical and mechanical devises and system sewage.

Annex 1.4
PO (Plan of Operations)

Project Monitoring Sheet II (Plan of Operation)

Version 1

Dated September 22, 2015

Project Title: Project for Improving the Capacity of WASAs in Punjab Province

| Project Title: Project for Improving the Capacity of WASAs in Punjab Province | | | | | | | | | | | | | | | Monitoring | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--------|------|------|------------|------|-----|----|------|------|-----|----|------|------|--------------------------|----------|--------------|-------------------------|----------|----------|--|--|--|
| Inputs | | | | | | | | | | | | Plan | | 2015 | | 2016 | | | | 2017 | | | | 2018 | | Remarks | | Issue | Solution | | | | |
| | | | | | | | | | | | | Actual | III | IV | I | II | III | IV | I | II | III | IV | I | II | | | | | | | | | |
| Expert | | | | | | | | | | | | | | | | | | | | | | | | | | | | | No Issue | | | | |
| Chief advisor/ training management/O&M of water sector | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| Leak detection | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| O&M of Water supply facilities | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| O&M of Mechanical Equipment | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| O&M of Electrical Equipment | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| O&M of Drainage and Sewerage | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| Water utilities business management including asset management and planning | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| Curriculum development and Assessment | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| Training and OJT skill, and Material Development | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| Equipment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | No Issue | | | |
| Equipment for common use at Al-Jazari Academy | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| Equipment for training | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| Training in Japan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | No issue | | | |
| Counterpart training for Output 1 | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| Counterpart training for Output 2 | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| In-country/Third country Training | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| Activities | | | | | | | | | | | | Plan | 2015 | | 2016 | | | | 2017 | | | | 2018 | | Responsible Organization | | Achievements | Issue & Countermeasures | | | | | |
| Sub-Activities | | | | | | | | | | | | Actual | III | IV | I | II | III | IV | I | II | III | IV | I | II | Japan | Pakistan | | | | | | | |
| Output 1: Training system of Al-Jazari Academy is established. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-1 To review Master Plan of Project and management plan including budget, facility, personnel and organization system, and provide recommendation if necessary. | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| 1-2 To grasp needs for training of WASAs. | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |
| 1-3 To assess capacities at WASAs for | | | | | | | | | | | | Plan | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Actual | | | | | | | | | | | | | | | | | | | | | |

[illegible]

[illegible]

Annex 1.5
Faculty Members of Al-Jazari Academy as of April 2018

Responsibility for each faculty and staff of Al-Jazari Academy, and JICA Experts

| Training Course | Pakistan Side | JICA Expert | Responsibility (in Workshop) |
|---|---|---|------------------------------------|
| Leakage detection | Water Supply Specialist: Engr. Zia Mustafa | Leak Detection | Lecture (BPS 11-18) / Field Work |
| | Sr. Instructor Leak Detection: Vacant | | Lecture (BPS 11-18) / Field Work |
| | Tutor: Vacant | | Lecture (BPS 11-18) / Field Work |
| | Young Professional: Mr. Muhammad Faisal | | Field Work |
| | Young Professional: Mr. Rizwan Jabbar | | Field Work |
| O&M of tube well and pump facility | Water Supply Specialist: Engr. Zia Mustafa | O&M of water supply facilities | Lecture (BPS11-18) / Field Work |
| | Sr Instructor (Tube well & Pump Facility): Vacant | | Lecture (BPS 11 - 16) / Field Work |
| | Tutor: Vacant | | Lecture (BPS 11 - 16) / Field Work |
| | Young Professional: Ms. Ramisha Taseer | | Field Work |
| O&M of sewer and storm water drainage | Sewerage & Drainage Specialist: Vacant | O&M of sewerage & drainage | Lecture (BPS11-18) / Field Work |
| | Sr Instructor (Sewerage & Storm Water Drainage) Engr. Muhammad Irfan | | Lecture (BPS 11 - 16) / Field Work |
| | Tutor: Vacant | | Lecture (BPS 11 - 16) / Field Work |
| | Young Professional (Sewerage & Storm Water Drainage)2: Mr. Muhammad Fahad Hussain | | Field Work |
| O&M of electrical equipment | Technical Skilled Based Training Specialist: Engr. Mubashar Cheema | O&M of electrical equipment | Lecture (BPS11-18) / Field Work |
| | Sr Instructor (Electrical Equipment): Engr. Jawad Shahid | | Lecture (BPS 11 - 16) / Field Work |
| | Sr Instructor (Health & Safety): Mr. Ihsan ul Haque Javed | | Lecture (BPS 11 - 16) / Field Work |
| | Tutor: Vacant | | Lecture (BPS 11 - 16) / Field Work |
| O&M of mechanical equipment | Technical Skilled Based Training Specialist: Engr. Mubashar Cheema | O&M of mechanical equipment | Lecture (BPS11-18) / Field Work |
| | Sr Instructor (Health & Safety): Mr. Ihsan ul Haque Javed | | Lecture (BPS11-18) / Field Work |
| | Tutor: Vacant | | Lecture (BPS 11 - 16) / Field Work |
| | Young Professional (JICA Equipment): Engr. Tanveer Shahzad | | Field Work |
| Business Planning | Business Planning Specialist 1: Mr. Muhammad Kashif | Water utilities business management including asset management and planning | Lecture (BPS11-20) / Field Work |
| | Sr. Instructor (Business Planning): Mr. Kamran Baig | | Lecture (BPS 11 - 16) |
| | Tutor: Vacant | | Lecture (BPS 11 - 16) |
| Asset management for water supply and sewerage system | Asset Management Specialist: Mr. Asif Iqbal | | Lecture (BPS11-20) / Field Work |
| | Sr. Instructor (Asset Management): Mr. Ali Qumain | | Lecture (BPS 11 - 16) |
| | Sr. Instructor (GIS): Mr. Nizam ud din | | Lecture (BPS 11 - 16) |
| | Tutor: Ms. Aneeqa Azeem | | Lecture (BPS 11 - 16) |
| Curriculum development / evaluation system / technical skill training | | | |
| Item | Pakistan Side | JICA Expert | |
| Curriculum development / evaluation system / quality assurance / feedback system / training skill | Curriculum Instructional Design Specialist: Dr. (Mrs.) Shazia Ilyas | Chief Advisor Training Skill Curriculum development and assessment | |
| | OJT Sr. Instructor: Vacant | | |
| | Research Associate: Mr. Rehan Khallid | | |
| | Young Professional: Ms. Maryam Rabbani | | |
| | Young Professional: Ms. Ammara Asif | | |
| General Staff | | | |
| Administration | Administration Manager: Mr. Musab Uzair | | |
| Library | Librarian: Lubna Khalid | | |
| Computer Lab | Network Support Engineer: Mr. Muhammad Shafiq Bhatti | | |
| Computer Lab | RA (IT): Muhammad Sibtain Athar | | |

List of Academy Staff

| Sr. No | Name | Position | Working Period | | Remarks |
|--------|----------------------------|---|----------------|------------|---|
| | | | from | to | |
| 1 | Dr Kiran Farhan | Principal | 2015/8/1 | | Additional assignment from Sr Specialist of Urban Unit |
| 2 | Mr. Abdul Razzaq | Asset Management Specialist | 2015/8/1 | 2016/3/19 | Dispatched from Urban Unit as per need |
| 3 | Engr. Abid Hussainy | Asset Management Specialist | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 4 | Mr. Asif Iqbal | Asset Management Specialist | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 5 | Mr. Faisal Qureshi | Business Planning Specialist | 2016/3/21 | 2016/12/31 | Left |
| 6 | Muhammad Kashif | Business Planning Specialist | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 7 | Mr. Salman Ashraf Qureshi | Senior Instructor (Business Planning) | 2015/3/1 | 2017/1/31 | Left |
| 8 | Mrs. Sadaf Shah Hussainy | Curriculum & Instructional Design Specialist | 2015/3/1 | 2017/06/02 | Left |
| 9 | Mr. Rehan Khaled | Research Associate | 2016/4/28 | | |
| 10 | Engr. Zia Mustafa | Water Supply Specialist | 2015/8/20 | | |
| 11 | Engr. Mubassher A. Cheema | Technical Skills Based Training Specialist | 2015/12/10 | | |
| 12 | Engr. Jawad Shahid | Senior Instructor (Electrical and Mechanical Equipment) | 2016/2/26 | | |
| 13 | Engr. Tanveer Shahzad | Young Professional (JICA Equipment) | 2015/3/1 | | |
| 14 | Mr. Sami Ullah | Senior Tutor (Leak Detection) | 2015/10/5 | 2016/12/8 | Left |
| 15 | Ms. Ramisha Taseer | Young Professional (Leak Detection) | 2016/3/14 | | |
| 16 | Engr. Naqi Iqbal | Sewerage & Drainage Specialist | 2015/9/11 | 2015/10/12 | Left (Family Issue) |
| 17 | Engr. Muhammad Irfan | Sr. Instructor (Sewerage and Storm Drainage 1) | 2016/3/14 | | |
| 18 | Engr. Kashif Nadeem | Senior Instructor (Sewerage & Storm Water Drainage 2) | 2015/8/1 | 2016/09/30 | Shifted to Urban Unit in some other project |
| 19 | Ms. Maryam Rabbani | Young Professional (Sewerage & Storm Water Drainage 1) | 2016/3/14 | | |
| 20 | Ms. Ammara Asif | Young Professional (Sewerage & Storm Water Drainage 2) | 2016/3/14 | | |
| 21 | Mr. Ihsan-ul-Haque Javed | Sr. Instructor (Health & Safety) | 2015/3/1 | | |
| 22 | Mr. Waseem K Haq | Admin Manager | 2015/2/2 | | Shifted to Urban Unit in some other project, can come back. |
| 23 | Ms. Lubna Khalid | Librarian | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 24 | Mr. Umer Rafique | IT Assistant | 2015/8/1 | 2016/11/26 | Shifted to Urban Unit in some other project |
| 25 | Ms. Aneeqa Azeem | Young Professional (GIS) | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 26 | Mr. Muhammad Musab Uzair | Officer Admin – Accounts | 2017/1/16 | | |
| 27 | Mr. Muhammad Sibtain Athar | RA (IT) | 2016/11/26 | | Dispatched from Urban Unit for Academy |

| | | | | | |
|----|----------------------------|--|---|------------|---|
| 28 | Mr. Muhammad Samie | Sr. Instructor (Business Planning) | 2016/12/22 | 2017/05/31 | Shifted to Urban Unit in some other project |
| 29 | Miss Maria Rauf | Young Professional (Curriculum and Instructional Design) | 2016/11/1 | 2017/07/01 | Left (for foreign studies) |
| 30 | Mr. Muhammad Faisal | Young Professional (Leakage Detection) | 2017/1/24 | | |
| 31 | Mr. Rizwan Jabbar | Young Professional (Leakage Detection) | 2017/2/1 | | |
| 32 | Mr. Syed Fahad Hussain | Young Professional (Sewer & Storm Water Drainage) | 2016/9/29 | | |
| 33 | Mr. Nizam-ud-din | GIS Manager | 2016/5/20 (Academy) 2007/10/1 (Urban Unit) | | Dispatched from Urban Unit for Academy |
| 34 | Dr. Shazia Ilyas | Curriculum & Instructional Design Specialist | 2017/03/27 | | |
| 35 | Mr. Muhammad Shafiq Bhatti | Network Support Engineer | 2017/03/27 | | |

Annex 2.1
Flow Chart

| Year | | 2015 | | | | | | 2016 | | | | | | |
|---|-----------------------------------|---|--|---|----|--|---------------------|--------------------------------------|-------|---|--------|--------|---|--|
| Month | | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | |
| Contract Year | | [A] First Year | | | | | | | | | | | | |
| General | | [A-1] | Preparation and discussion for Inception Report | | | | | | | | | | | |
| | | [A-2] | | | | [A-3] Assistance for training program in Japan | | | | | | | | |
| | | Preparation of technical specification for equipment to be procured | | | | | | | | | | | | |
| | | [A-4] Assistance for inviting lecturer | | | | | | | | | | | | |
| | | | | | | | Progress monitoring | | [A-5] | | | | | |
| | | | | | | | | Preparation of Progress Report (PR1) | | | | [A-6] | | |
| Output 1: Training system of Al-Jazari Academy is established. | | [A-7] | Review on project activities, and operation and management plan including budget, facility, personnel, and organization structure, and provision of recommendation | | | | | | | | | | | |
| | | [A-8] | Preparation of the detail activities for the project through obtaining training needs and CA of WASA | | | | | | | | | | | |
| | | | | | | [A-9] Development of training system for the Al-Jazari Academy | | | | | | | | |
| | | | | | | Provision of training on training methods and pedagogical skill to lecturers | | | | | [A-10] | | | |
| | | | Establishment of evaluation / testing methods for training course and staff of Al-Jazari Academy in order to sustain and improve training quality | | | | | | | | [A-11] | | | |
| | | | | | | Establishment of OJT Implementation Procedure | | | | | [A-12] | | | |
| | | | | | | Review and improvement on training system of Al-Jazari Academy | | | | | | [A-13] | | |
| Output 2: The faculties at Al-Jazari Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management. | | | | | | | | | | | | | | |
| Output 3: OJT is implemented by trainees of WASAs trained at Al-Jazari Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management. | | | | | | | | | | | | | | |
| Committee | JCC | | | ▲ | | | | | | | | ▲ | | |
| | PCC | | | ▲ | | | | | | | | ▲ | | |
| Report | Progress Report | | | | | | | | | | | | ▲ | |
| | Project Completion Report (Draft) | | | | | | | | | | | | | |
| | Project Completion Report | | | | | | | | | | | | | |

| Year | | 2016 | | | | | 2017 | | | | | |
|---------------|---|--|---|----|----|----|------|---|---|---|---|---|
| Month | | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 |
| Contract Year | | [B] Second Year | | | | | | | | | | |
| General | | <div>[B-1] Assistance for equipment procurement</div> <div>[B-2] Assistance for training program in Japan</div> <div>[B-3] Assistance for inviting lecturer</div> <div>Progress monitoring [B-4]</div> <div>Preparation of Progress Report (PR2) [B-5]</div> | | | | | | | | | | |
| | | | | | | | | | | | | |
| | Output 1: Training system of Al-Jazari Academy is established. | <div>[B-6] Review and improvement on training system of Al-Jazari Academy</div> | | | | | | | | | | |
| | | | | | | | | | | | | |
| | Output 2: The faculties at Al-Jazari Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management. | <div>[B-7] Provision of training courses for each subject</div> <div>[B-8] Preparation of OJT plan</div> | | | | | | | | | | |
| | | | | | | | | | | | | |
| | Output 3: OJT is implemented by trainees of WASAs trained at Al-Jazari Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management. | <div>[B-9] Monitoring and technical advice against OJT implemented by trained staff at Al-Jazari Academy</div> | | | | | | | | | | |
| Committee | JCC | | | | ▲ | | | | | | ▲ | |
| | PCC | | ▲ | ▲ | | ▲ | | | ▲ | | | |
| Report | Progress Report | | | | | | | | | | | ▲ |
| | Project Completion Report (Draft) | | | | | | | | | | | |
| | Project Completion Report | | | | | | | | | | | |

| Year | | 2017 | | | | | | 2018 | | | | | | |
|---|-----------------------------------|----------------|---|---|----|----|----|------|---|---|---|---|---|---|
| Month | | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Contract Year | | [C] Third Year | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Output 1: Training system of Al-Jazari Academy is established. | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Output 2: The faculties at Al-Jazari Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management. | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Output 3: OJT is implemented by trainees of WASAs trained at Al-Jazari Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management. | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Committee | JCC | | | | | | | | | | | ▲ | | |
| | PCC | | | | | ▲ | | | ▲ | | | | | |
| Report | Progress Report | | | | | | | | | | | | | |
| | Project Completion Report (Draft) | | | | | | | | | | ▲ | | | |
| | Project Completion Report | | | | | | | | | | | | ▲ | |

Annex 2.2
Detailed Activity Plan

Project Title: Project for Improving the Capacity of WASAs in Punjab Province

Output 1: Training system of Al-Jazari Academy is established.

[illegible]

| | | | | | | | | | | | | | |
|--|--|----|------|----|-------|----|--|----|--|--|--|-------------------------------------|--|
| a) O&M of tube well and pump facility |  |  | .... |  | .. |  |  |  |  |  |  | Mr. Takuji Okubo | Engr. Zia Mustafa/ Engr. Sami Ullah/ Ms. Ramisha Taseer/ Syed Fahad Hussain |
| b) leakage detection and management |  |  | .... |  | .. |  |  |  |  |  |  | Mr. Chiaki Suzuki | Engr. Zia Mustafa/ Engr. Sami Ullah/ Ms. Ramisha Taseer/ Syed Fahad Hussain |
| c) O&M of sewer and storm water drainage including safety precaution and HSE |  |  | .. |  | .... |  |  |  |  |  |  | Mr. Yusuke Ando | Engr. Muhammad Irfan/ Engr. Kashif Nadeem/ Ms. Ammara Asif/ Ms. Mariyam Rabbani |
| d) O&M of disposal station |  |  | .. |  | .... |  |  |  |  |  |  | Mr. Akira Hasebe/ Mr. Ryuta Kudo | Engr. Mubasshar Cheema/ Mr. Ihsan ul Haq/ Engr. Tanveer Shahzad/ Engr. Jawad Shahid |
| e) asset management for water supply and sewerage system. |  |  | .... |  | .. | .. |  |  |  |  |  | Mr. Yusuyuki Kuroda | Engr. Abid Hussainy / Mr. Abdul Razzaq/ Mr. Faisal Qureshi/ Mr. Ali Raza/ Mr. M Kashif/ Mr. Asif Iqbal/ Mr. Salman Qureshi/ Ms. Aneeqa/ Mr. Nizam ud din |
| f) reporting and compliance |  |  | .... |  |  |  |  |  |  |  |  | Mr. Yusuyuki Kuroda | Mr. Faisal Qureshi/ Mr. M Kashif/ Mr. Salman Qureshi/ |
| 1-5 To formulate annual training implementation plan | | | | .. | | | | .. | | | | All | All |
| 1-6 To train Al-Jazari Academy staff to acquire capacity of training coordination |  |  |  |  | ..... |  |  |  |  |  |  | All | All |
| 1-7 To train Al-Jazari Academy staff to acquire teaching and pedagogical skills | | .. | .. | .. | .. | | | | | | | Mr. Ken Yokohama/ Mr. Noaki Matsuo | All |
| 1-8 To establish evaluation and testing mechanism for training course and Al-Jazari Academy staff for quality assurance. |  |  |  | .. | .... |  |  |  |  |  |  | Mr. Ken Yokohama/ Dr. Nobuyuki Sato | Mrs. Saddaf Hussainy/ Mr. Rehan/ Ms. Maria Rauf |
| 1-9 To revise manual, training curriculum and training material for improving training course. |  |  |  |  | ..... |  |  |  |  |  |  | All | All |
| 1-10 To develop and establish the procedure of Output 3. |  |  |  |  | ..... |  |  |  |  |  |  | All | All |

Legend

..... : JICA Expert

..... : C/P

Project Title: Project for Improving the Capacity of WASAs in Punjab Province

Output 2: The faculties at Al-Jazari Academy provide the training to staff of WASAs and the public water sector for improving the water supply and sewerage system and its management.

| Activities | Program | | | | | | | | | | | | Expert | C/P |
|--|---------|----|------|----|-----|-------|------|----|-----|----|------|----|----------------------------------|---|
| | 2015 | | 2016 | | | | 2017 | | | | 2018 | | | |
| | III | IV | I | II | III | IV | I | II | III | IV | I | II | | |
| 2-1 To conduct Training course(s) for basic knowledge. | | | | | | | | | | | | | All | All |
| 2-2 To conduct training course(s) for a subject of | | | | | | | | | | | | | | |
| i) O&M of tube well and pump facility | | | | | | ... | | | | | | | Mr. Takuji Okubo | Engr. Zia Mustafa/ Engr. Sami Ullah/ Ms. Ramisha Taseer/ Mr. Syed Fahad Hussain |
| ii) leakage detection | | | | | | ... | | | | | | | Mr. Chiaki Suzuki | Engr. Zia Mustafa/ Engr. Sami Ullah/ Ms. Ramisha Taseer/ Mr. Syed Fahad Hussain |
| iii) O&M of sewer and storm water drainage including safety precaution | | | | | | ... | | | | | | | Mr. Yusuke Ando | Engr. Muhammad Irfan/ Ms. Ammara Asif/ Ms. Mariyam Rabbani |
| iv) O&M of electrical and mechanical equipment for disposal station, and sewerage and drainage | | | | | | | | | | | | | Mr. Akira Hasebe/ Mr. Ryuta Kudo | Engr. Mubasshar Cheema/ Mr. Ihsan ul Haq/ Engr. Tanveer Shahzad/ Engr Jawad Shahid |
| v) Asset management for water supply and sewerage system. | | | | | | | | | | | | | Mr. Yusuyuki Kuroda | Engr. Abid Hussainy / Mr. Faisal Qureshi/ Mr. M Kashif/ Mr. Asif Iqbal/ Mr. Ali Raza/ Mr. Salman Qureshi/ Ms. Aneeqa/ Mr. Nizam ud din |
| vi) Management of assets and operational and business planning | | | | | | | | | | | | | Mr. Yusuyuki Kuroda | Engr. Abid Hussainy/ Mr. Faisal Qureshi/ Mr. M Kashif/ Mr. Asif Iqbal/ Mr. Ali Raza/ Mr. Muhammad Samie / Mr. Salman Qureshi/ Ms. Aneeqa/ Mr. Nizam ud din/ |

| | | | | | | | | | | | | | |
|--|--|--|--|--|--|-------|-----|--|--|-----|-----|--|---|
| 2-3 To prepare an OJT plan for a subject of | | | | | | | | | | | | | |
| i) O&M of tube well and pump facility | | | | | | ... | ... | | | ... | ... | Mr. Takuji Okubo | Engr. Zia Mustafa/ Engr. Sami Ullah/ Ms. Ramisha Taseer/ Mr. Syed Fahad Hussain/ Mr. Faisal Qureshi/ Mr. Rizwan Jabbar |
| ii) leakage detection | | | | | | ... | ... | | | ... | ... | Mr. Chiaki Suzuki/ Mr. Takeshi Yajima | Engr. Zia Mustafa/ Engr. Sami Ullah/ Ms. Ramisha Taseer/ Mr. Syed Fahad Hussain/ Mr. Faisal Qureshi/ Mr. Rizwan Jabbar |
| iii) O&M of sewer and storm water drainage including safety precaution |  |  |  |  |  | ..... |  |  |  | ... | ... | Mr. Yusuke Ando/ Mr. Ryuta Kudo/ Dr. Nobuyuki Sato | Engr. Muhammad Irfan/ Ms. Ammara Asif/ Ms. Mariyam Rabbani/ Mr. Syed Fahad Hussain |
| iv) O&M of disposal station |  |  |  |  |  | ..... |  |  |  | ... | ... | Mr. Ryuta Kudo/ Mr. Akira Hasebe/ Mr. Takeo Maruyama | Engr. Mubasshar Cheema/ Mr. Ihsan ul Haq/ Engr. Tanveer Shahzad/ Engr. Jawad Shahid |
| v) Asset management for water supply and sewerage system. |  |  |  |  |  | .... |  |  |  | ... | ... | Mr. Yusuyuki Kuroda | Engr. Abid Hussainy / Mr. Faisal Qureshi/ Mr. M Kashif/ Mr. Asif Iqbal/ Mr. Ali Raza/ Mr. Salman Qureshi/ Mr. Muhammad Samie/ Ms. Aneeqa/ Mr. Nizam ud din/ Mr. Ali Qumain/ Mr. Kamran Baig |
| 2-4 To conduct regular training course(s) updated contents through previous training and OJT activities for a subject of | | | | | | | | | | | | | |
| i) O&M of tube well and pump facility | | | | | | | ... | | | ... | ... | Mr. Takuji Okubo | Engr. Zia Mustafa/ Ms. Ramisha Taseer/ Mr. Syed Fahad Hussain/ Mr. Faisal Qureshi/ Mr. Rizwan Jabbar |

| | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|-------|-----|--|-----|-------|-------|---|--|
| ii) leakage detection | | | | | | | ... | | | ... | | ... | Mr. Chiaki Suzuki/ Mr. Takeshi Yajima | Engr. Zia Mustafa/ Ms. Ramisha Taseer/ Mr. Syed Fahad Hussain/ Mr. Faisal Qureshi/ Mr. Rizwan Jabbar |
| iii) O&M of sewer and storm water drainage including safety precaution |  |  |  |  |  |  | ..... |  |  | ... |  | ... | Mr. Yusuke Ando/ Mr. Ryuta Kudo/ Dr. Nobuyuki Sato | Engr. Muhammad Irfan/ Ms. Ammara Asif/ Ms. Mariyam Rabbani/ Mr. Syed Fahad Hussain |
| iv) O&M of electrical and mechanical equipment for disposal station, and sewerage and drainage |  |  |  |  |  |  |  | ... |  | ... | ..... | ..... | Mr. Ryuta Kudo/ Mr. Akira Hasebe/ Mr. Takeo Maruyama | Engr. Mubasshar Cheema/ Mr. Ihsan ul Haq/ Engr. Tanveer Shahzad/ Engr. Jawad Shahid |
| v) Asset management for water supply and sewerage system. |  |  |  |  |  |  | ..... |  |  |  |  | ... | Mr. Yusuyuki Kuroda | Engr. Abid Hussainy / Mr. M Kashif/ Mr. Asif Iqbal / Mr. Ali Raza/ Mr. Muhammad Samie / Ms. Aneeqa/ Mr. Nizam ud din/ Mr. Ali Qumain/ Mr. Kamran Baig |

Legend

 : JICA Expert

..... :C/P

Project Title: Project for Improving the Capacity of WASAs in Punjab Province

Output 3: OJT is implemented by trainees of WASAs trained at Al-Jazari Academy for O&M of water supply, sewerage, storm water system, electrical and mechanical machinery and leakage management.

| Activities | Program | | | | | | | | | | | | Expert | C/P |
|---|---------|----|------|----|-----|----|-------|----|-----|-------|------|----|--|---|
| | 2015 | | 2016 | | | | 2017 | | | | 2018 | | | |
| | III | IV | I | II | III | IV | I | II | III | IV | I | II | | |
| 3-1 To conduct OJT to WASA's workers by the trainees at Al-Jazari Academy as planned on the activity 2-3 for a subject of | | | | | | | | | | | | | | |
| i) O&M of tube well and pump facility | | | | | | | | | | | ... | | Mr. Takuji Okubo | Engr. Zia Mustafa/ Ms. Ramisha Taseer/ Mr. Syed Fahad Hussain/ Mr. Faisal Qureshi/ Mr. Rizwan Jabbar |
| ii) leakage detection | | | | | | | | | | | ... | | Mr. Chiaki Suzuki/ Mr. Takeshi Yajima | Engr. Zia Mustafa/ Ms. Ramisha Taseer/ Mr. Syed Fahad Hussain/ Mr. Faisal Qureshi/ Mr. Rizwan Jabbar |
| iii) O&M of sewer and storm water drainage including safety precaution | | | | | | | | | | | ... | | Mr. Yusuke Ando/ Mr. Ryuta Kudo/ Dr. Nobuyuki Sato | Engr. Muhammad Irfan/ Ms. Mariyam Rabbani/ Mr. Syed Fahad Hussain |
| iv) O&M of electrical and mecahnical equipment for disposal station, and sewerage and drainage | | | | | | | | | | | | | Mr. Ryuta Kudo/ Mr. Akira Hasebe/ Mr. Takeo Maruyama | Engr. Mubasshar Cheema/ Mr. Ihsan ul Haq/ Engr. Tanveer Shahzad/ Engr. Jawad Shahid |
| v) Asset management for water supply and sewerage system. | | | | | | | | | | | ... | | Mr. Yusuyuki Kuroda | Engr. Abid Hussainy / Mr. M Kashif/ Mr. Asif Iqbal/ Mr. Muhammad Samie/ Mr. Ali Raza/ Ms. Aneeqa/ Mr. Nizam ud din/ Mr. Ali Qumain/ Mr. Kamran Baig |

Legend

..... : JICA Expert

..... :C/P

Annex 2.3

*Letter on Ownership Transfer of Equipment Procured
by JICA Expert Team to Al-Jazari Academy on May 3, 2016*

Project for Improving the Capacity of WASAs in Punjab Province in Islamic Republic of Pakistan

3rd May, 2016

Dr. Kiran Farhan

Principal, Al-Jazari Water and Sanitation Academy

Transferring Ownership of Equipment

Dear Dr. Kiran

JICA is transferring an ownership of the equipment listed as in the attachment to Al-Jazari Water and Sanitation Academy, Lahore. In the process, the following conditions between JICA and Al-Jazari Water and Sanitation Academy were agreed:

- 1) The equipment will be used exclusively for training activities related to the "Project for Improving the Capacity of WASAs in Punjab Province in Islamic Republic of Pakistan".
- 2) After the project, Al-Jazari Water and Sanitation Academy will provide information (location, operation, condition, etc.) about the equipment at request.

Thank you very much for your attention.

Best regards

DR. NOBUYUKI SATO

Chief Advisor

cc: MD WASA Lahore

cc: CEO, The Urban Unit, Lahore

Received

Dr. Kiran Farhan
3/5/16

Dr. Kiran Farhan
Principal
Al-Jazari Academy

List of Equipment

| Item No. | Description of Goods | Quantity |
|----------|--|----------|
| 1. | Portable Ultra- sonic Flow Meter Model: UF801P (with SE-1515 Probe) | 2 |
| 2. | Pressure Gauge Model: FJN-501A | 2 |
| 3. | Metal Locator Model: M130 | 2 |
| 4. | Non-metal Pipe Locator Model: D305 | 2 |
| 5. | Acoustic Leak Detector Model: AQUASCOPE3 (AS3P) | 2 |
| 6. | Metal pipe Locator Model: 501 | 2 |
| 7. | Pressure Recorder Model: FJN-501A | 1 |
| 8. | Multi gas (CO, H2S, CH4, O2) meter Model: GX-8000 (Type B) | 2 |
| 9. | Acoustic bar Model: LSP-1.0 (1m) | 2 |
| 10. | Distance meter Model: EN-R 1000 | 8 |
| 11. | Laptop PC Model: HP Probook 450 | 6 |
| 12. | Desktop PC Model: Dell OptiPlex 9020 | 1 |

Annex 2.4

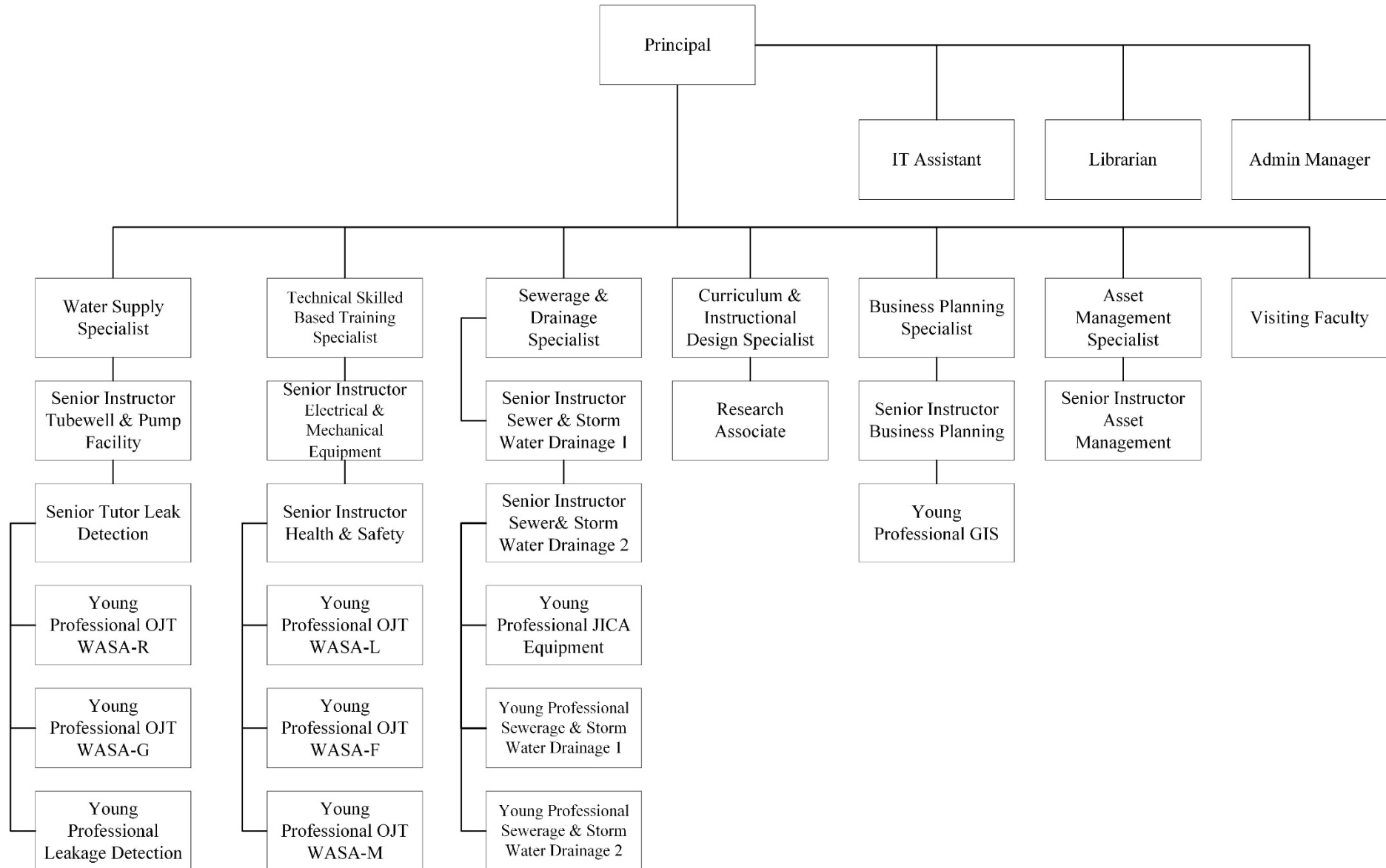
List of Trainees for Training in Japan in First Project Year

Project for Improving the Capacity of WASAs in Punjab Province
List of Trainees for the training in Japan

| No | Name | Sex | Organization | Position |
|----|---------------------|-----|-------------------|------------------------------|
| 1 | Muazzam Jamil Malik | M | HUD/PHED | Deputy Secretary |
| 2 | Abid Shah Hussainy | M | The Urban Unit | Senior Specialist |
| 3 | Dr. Kiran Farhan | F | Al-Jazari Academy | Principal |
| 4 | Abdul Qadeer Khan | M | Lahore WASA | Director (P&D) |
| 5 | Muhammad Tanveer | M | Lahore WASA | Director (P&E) |
| 6 | Shakeel Kashmiri | M | Lahore WASA | Director |
| 7 | Roohan Javed | M | Faisalabad WASA | Deputy Director I&C |
| 8 | Usman Zia | M | Faisalabad WASA | Deputy Director Water |
| 9 | Rao Qasim | M | Multan WASA | Director Recovery |
| 10 | Abdus Salam | M | Multan WASA | Deputy Director Water Supply |
| 11 | Aziz Ullah Khan | M | Rawalpindi WASA | Director Sewerage |
| 12 | Saqib Elahi | M | Rawalpindi WASA | Deputy Director Water Supply |
| 13 | Fida Hussain | M | Gujranwala WASA | Director |
| 14 | Iqbal Ahmed | M | Gujranwala WASA | Deputy Director |

Annex 2.5
Organization Charts and Faculty Members
of Al-Jazri Academy as of June 2016

AI-JAZARI WATSAN ACADEMY ORGANOGRAM



Responsibility for each faculty and staff of Al-Jazari WATSAN Academy, and JICA Experts

| Training Course | Pakistan Side | JICA Expert | Responsibility |
|---|--|---|------------------------------------|
| Leak detection | Water Supply Specialist: Engr. Zia Mustafa | Leak Detection | Lecture (BPS 11-18) / Field Work |
| | Sr. Tutor Leak Detection: Engr. Sami Ullah | | Field Work |
| | Young Professional Leak Detection: Ramisha Taseer | | Field Work |
| O&M of tube well and pump facility | Water Supply Specialist: Engr. Zia Mustafa | O&M of water supply facilities | Lecture (BPS11-18) / Field Work |
| | Sr Instructor (Tubewell & Pump Facility): Vacant | | Lecture (BPS 11 - 16) / Field Work |
| | Young Professional OJT WASA-R | | Lecture (BPS 1-10) |
| | Young Professional OJT WASA-G | | Lecture (BPS 1-10) |
| O&M of sewer and storm water drainage | Sewerage & Drainage Specialist: Vacant | O&M of sewerage & drainage | Lecture (BPS11-18) / Field Work |
| | Sr Instructor (Sewerage & Storm Water Drainage) 1: Engr. Muhammad Irfan | | Lecture (BPS 11 - 16) / Field Work |
| | Sr Instructor (Sewerage & Storm Water Drainage) 2: Engr. Kashif Nadeem | | Lecture (BPS 11 - 16) / Field Work |
| | Young Professional (JICA Equipment): Engr. Tanveer Shahzad | | Field Work |
| | Young Professional (Sewerage & Storm Water Drainage)1: Ammara Asif | | Field Work |
| | Young Professional (Sewerage & Storm Water Drainage)2: Maryam Rabbani | | Field Work |
| O&M of electrical and mechanical equipment for disposal station, sewerage and drainage | Technical Skilled Based Training Specialist: Engr. Mubasshar Cheema | O&M of electrical & mechanical equipment | Lecture (BPS11-18) / Field Work |
| | Sr Instructor (Electrical & Mechanical Equipment): Engr. Jawad Shahid | | Lecture (BPS 11 - 16) / Field Work |
| | Sr Instructor (Health & Safety): Mr. Ihsan ul Haque Javed | | Lecture (BPS 11 - 16) / Field Work |
| | Young Professional OJT WASA-L | | Lecture (BPS 1-10) |
| | Young Professional OJT WASA-F | | Lecture (BPS 1-10) |
| | Young Professional OJT WASA-M | | Lecture (BPS 1-10) |
| Business Planning | Business Planning Specialist 1: Mr. Muhammad Kashif | Water utilities business management including asset management and planning | Lecture (BPS11-20) / Field Work |
| | Business Planning Specialist 2: Mr. Faisal Qureshi | | Lecture (BPS11-20) / Field Work |
| | Sr. Instructor (Business Planning): Salman Qureshi | | Lecture (BPS 11 - 16) |
| | Young Professional (GIS): Ms. Aneeqa Azeem | | Field Work |
| Asset management for water supply and sewerage system | Asset Management Specialist: Engr. Abid Hussainy | | Lecture (BPS11-20) / Field Work |
| | Sr. Instructor (Asset Management): Mr. Asif Iqbal | | Lecture (BPS 11 - 16) |
| Curriculum development / evaluation system / technical skill training | | | |
| Item | Pakistan Side | JICA Expert | |
| Curriculum development / evaluation system / quality assurance / feedback system / training skill | Curriculum Instructional Design Specialist: Mrs. Sadaf Shah Hussainy | Chief Advisor Training Skill Curriculum development and assessment | |
| | Research Associate: Mr. Rehan | | |
| General Staff | | | |
| Administration | Administration Manager: Waseem K Haq | | |
| Library | Librarian: Lubna Khalid | | |
| Computer Lab | IT Assistant: Umer Rafique | | |

List of Academy Staff

| Sr. No | Name | Position | Working Period | | Remarks |
|--------|---------------------------|---|----------------|------------|--|
| | | | from | to | |
| 1 | Dr Kiran Farhan | Principal | 2015/8/1 | | Additional assignment from Sr Specialist of Urban Unit |
| 2 | Mr. Abdul Razzaq | Asset Management Specialist | 2015/8/1 | 2016/3/19 | Dispatched from Urban Unit as per need |
| 3 | Engr. Abid Hussainy | Asset Management Specialist | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 4 | Mr. Asif Iqbal | Asset Management Specialist | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 5 | Mr. Faisal Qureshi | Business Planning Specialist | 2016/3/21 | | |
| 6 | Muhammad Kashif | Business Planning Specialist | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 7 | Mr. Salman Ashraf Qureshi | Senior Instructor (Business Planning) | 2015/3/1 | | |
| 8 | Mrs. Sadaf Shah Hussainy | Curriculum & Instructional Design Specialist | 2015/3/1 | | |
| 9 | Mr. Rehan Khaled | Research Associate | 2016/4/28 | | |
| 10 | Engr. Zia Mustafa | Water Supply Specialist | 2015/8/20 | | |
| 11 | Engr. Mubassher A. Cheema | Technical Skills Based Training Specialist | 2015/12/10 | | |
| 12 | Engr. Jawad Shahid | Senior Instructor (Electrical and Mechanical Equipment) | 2016/2/26 | | |
| 13 | Engr. Tanveer Shahzad | Young Professional (JICA Equipment) | 2015/3/1 | | |
| 14 | Mr. Sami Ullah | Senior Tutor (Leak Detection) | 2015/10/5 | | |
| 15 | Ms. Ramisha Taseer | Young Professional (Leak Detection) | 2016/3/14 | | |
| 16 | Engr. Naqi Iqbal | Sewerage & Drainage Specialist | 2015/9/11 | 2015/10/12 | Left (Family Issue) |
| 17 | Engr. Muhammad Irfan | Sr. Instructor (Sewerage and Storm Drainage 1) | 2016/3/14 | | |
| 18 | Engr. Kashif Nadeem | Senior Instructor (Sewerage & Storm Water Drainage 2) | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 19 | Ms. Maryam Rabbani | Young Professional (Sewerage & Storm Water Drainage 1) | 2016/3/14 | | |
| 20 | Ms. Ammara Asif | Young Professional (Sewerage & Storm Water Drainage 2) | 2016/3/14 | | |
| 21 | Mr. Ihsan-ul-Haque Javed | Sr. Instructor (Health & Safety) | 2015/3/1 | | |
| 22 | Mr. Waseem K Haq | Admin Manager | 2015/2/2 | | |
| 23 | Ms. Lubna Khalid | Librarian | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 24 | Mr. Umer Rafique | IT Assistant | 2015/8/1 | | Dispatched from Urban Unit as per need |
| 25 | Ms. Aneeqa Azeem | Young Professional (GIS) | 2015/8/1 | | Dispatched from Urban Unit as per need |

Annex 2.6
Answers to Questions in Questionnaire by WASAs

WASA

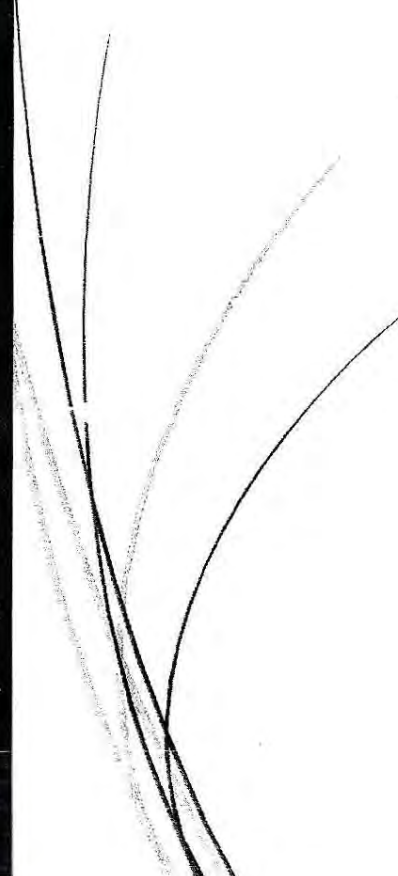
FAISALABAD



Questionnaire

Water Supply Business

For WASA Faisalabad



Japan International Cooperation Agency

Table of Contents

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| Questionnaire 1: | Information of WASA in Punjab Province |
| Questionnaire 2: | Leakage Prevention Work of WASA |
| Questionnaire 3: | Tube Well |
| Questionnaire 4: | Sewerage and Drainage |
| Questionnaire 5: | Management, Finance and Organization |

Questionnaire on the Water Supply Business

Questionnaire 1: Information of WASA in Punjab Province

1. City information 都市の情報

1-1. Name of water supply organization that performs water supply service 水道事業者名称

Water and Sanitation Agency, Faisalabad

1-2. Name of city that performs water supply service 水道事業を行う都市の名称

Faisalabad

1-3. Population of water service area (person) 給水都市の人口(人)

| 2011 | 2012 | 2013 | 2014 |
|--------------|--------------|---------------|---------------|
| 1.5 M | 1.8 M | 1.85 M | 1.90 M |

1-4. City area (km²) 都市の面積(km²)

| Total area | Water supply area |
|----------------------------|---------------------------|
| 1292 km² | 225 km² |

1-5. Number of service connection (number of water meter) 給水(契約)戸数(戸、水道メータ数)

| 2011 | 2012 | 2013 | 2014 |
|---------------|---------------|---------------|---------------|
| 109649 | 110715 | 111572 | 112081 |

1-6. Population served by water supply as percentage of total population (%) 水道普及率(%)

| 2011 | 2012 | 2013 | 2014 |
|------------|------------|------------|------------|
| 50% | 60% | 60% | 60% |

2. Water resource / Water treatment 水源／浄水

2-1. Water resource (m³/day) 水源(m³/日)

| Surface (River / Dam) | Groundwater | Seawater | Other |
|--------------------------------|---------------------------------|-----------|-----------|
| 20457 m³/day | 404682 m³/day | NA | NA |

2-2. Method of water intaken 取水方式

Ground Water Bulk Supply through Pumping

2-3. Number and capacity of Water Treatment Plant (WTP) (number, m³) 浄水場数と処理能力(箇所、m³)

| Number of WTP | Total capacity (m ³ /day) |
|---------------|--------------------------------------|
| 2 | 20457 m³/day |

| No. | WTP Name | Built year | Capacity | Treatment volume (average) |
|-----|---------------|------------|---------------------------|----------------------------|
| 1 | Jhal Khanuana | 1935 | 15911 m ³ /day | N/D m ³ /day |
| 2 | Millat Town | 1984-85 | 4546 m ³ /day | N/D m ³ /day |

2-4. Name and dosing rate of coagulant (mg/L) 凝集剤名称および注入率(mg/L)

| Name of coagulant | Dosing rate of coagulant (mg/L) |
|-------------------|---------------------------------|
| Alum | 3 – 7 mg/L |

2-5. Type of sedimentation and filtration 沈殿・ろ過の種類

| | |
|-----------------------|--------------------------------|
| Type of sedimentation | Sedimentation Storage Tank |
| Type of filtration | Slow sand rapid Gravity Filter |

2-6. Filtration speed rate (m/day) ろ過速度(m/day)

| | |
|--|--|
| Slow sand filter | Rapid sand filter |
| 0.2 to 0.3 m ² /m ³ /day | 0.6 to 0.7 m ² /m ³ /day |

2-7. Name and dosing rate of disinfection (mg/L) 消毒剤名称および注入率(mg/L)

| Name of disinfection | Dosing rate of disinfection (mg/L) |
|----------------------|------------------------------------|
| Chlorination | 1 mg/L |

2-8. Number and capacity of distribution reservoir (number, m³) 配水池数と容量(箇所、m³)

| Number | Total capacity (m) | Minimum reservoir (m ³) | Maximum reservoir (m ³) |
|--------|-----------------------|-------------------------------------|-------------------------------------|
| 44 | 100000 m ³ | 80000 m ³ | 110000 m ³ |

2-9. Production cost of water treatment (PHP/m³) 造水コスト(PHP/m³)

| | |
|------------------------|------------------------|
| N/D PHP/m ³ | N/D USD/m ³ |
|------------------------|------------------------|

2-10. Number of items of water quality inspection (number) 水質検査項目数(数)

| Everyday | Every week | Every month | Every year |
|-----------------|----------------|--------------------|------------|
| 1 day / 100,000 | 2 day / 50,000 | One month / 20,000 | N/D |

2-11. Hour of water suspension and supply turbidity water (times, hour/year) 断水・濁水時間(時間/年)

| | Number of times | Total hours |
|------------------------|-------------------|-------------|
| Water suspension | 3 – 4 days | 88 |
| Supply turbidity water | 24 hour available | 24 x 365 |

2-12. Describe the problem about water treatment 浄水処理の問題点の記述

Some time high value of silt observed due to which chocking of filter beds occurs.

3. Organization 組織体制

3-1. Total number of KCWN staff member (person) 職員数(人)

| 2011 | 2012 | 2013 | 2014 |
|------------|------------|------------|------------|
| 468 | 472 | 495 | 521 |

3-2. Total number of engineer staff member (person) 技術職員数(人)

| 2011 | 2012 | 2013 | 2014 |
|----------|----------|----------|----------|
| 7 | 7 | 8 | 9 |

3-3. Proportion of staff member according to staff's age (%) 職員年齢構成(%)

| 10's – 20's | 30's | 40's | 50's – |
|-------------|------------|------------|------------|
| 0% | 30% | 50% | 20% |

3-4. Proportion of staff member's business experience of water supply (%) 職員経験年数構成(%)

| – 5 years | 5 – 10 years | 10 – 20 years | 20 – 30 years | 30 years – |
|------------|--------------|---------------|---------------|------------|
| 35% | 18% | 20% | 23% | 4% |

3-5. Hour of staff's training (times/person, hour/year/person) 職員研修時間(回/人、時間/人)

| | Inner training (exclude OJT) | | Outsourcing | |
|------------------|------------------------------|-------------------|--------------|-------------------|
| | Times/person | Total hour/person | Times/person | Total hour/person |
| Engineer | 12 | 24 | N/A | N/A |
| Exclude engineer | N/D | N/D | N/D | N/D |

4. Water tariff 水道料金

4-1. Price and consumption of domestic and commercial use (PHP, m³, average per month)

家事・業務用水道料金・使用水量(PHP/m³: 平均額)

| | Price | Average Consumption |
|----------------|--------------------|-----------------------|
| Domestic use | PHP/m ³ | m ³ /month |
| Commercial use | PHP/m ³ | m ³ /month |

(Sheet attached / copy attached at Annex - “A”)

4-2. Collection frequency (month) 水道料金徴収間隔(月)

| |
|------------------|
| Per Month |
|------------------|

4-3. Collection rate of water charge (%) 水道料金徴収率(%)

| Domestic use | Commercial use | Total Collection Efficiency (Financial) | Total Collection Efficiency (Physical) |
|--------------|----------------|--|---|
| N/D % | N/D % | 63.91% | 27.60% |

4-4. Describe/Attach the water tariff table 水道料金表の記載

| |
|---|
| <p>Copy of WASA Revenue Tariff attached at Annex - "A"</p> |
|---|

Remarks:

Money exchange rate: 1 US Dollar (USD) = 104.09 Pakistani rupee (PKR) on April 2015

If no data, answer is "N/D", else if no answer or non-applicable, answer is "N/A".

Questionnaire on the Water Supply Business

Questionnaire 2: Leakage Prevention Work of WASA

1. Organization 組織

1-1. Name of organization for leakage prevention 漏水対策を担当する組織名称

- 1) Water Resources Directorate, WASA, Faisalabad
- 2) Water Distribution and Maintenance Directorate, WASA, Faisalabad

1-2. Number of person in organization (person) 漏水対策を担当する組織の人員数(人)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 468 | 472 | 495 | 521 |

1-3. Annual training time for leakage prevention (person, person x hours)

漏水対策に関する年間研修時間(人×時間)

| | 2013 | 2014 |
|----------------|------|------|
| Person | 10 | 15 |
| Person X Hours | 240 | 330 |

2. Leakage Detection 漏水調査

2-1. Number of leakage survey team (number) 調査チーム数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| Nil | Nil | 2 | 2 |

2-2. Number of person in one survey team (person) 1チーム当りの人数(人)

8

2-3. Number of days of leakage survey (person x days / year) 年間漏水調査日数(人×日/年)

| 2011 | 2012 | 2013 | 2014 |
|------|------|---------|---------|
| - | - | 8 x 120 | 8 x 150 |

2-4. Number of hours of average leakage survey (person x hours / month) 調査平均時間(人×時間/月)

8 x 250/month

2-5. Length of leakage survey (km / year) 年間漏水調査延長(km/年)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D km | 600 km | 750 km |

2-6. Number of surface leakage detection (number / year) 年間地上漏水発見数(箇所/年)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 0 | 0 | 53 | 68 |

2-7. Number of underground leakage detection (number / year) 年間地下漏水発見数(箇所／年)

| 2011 | 2012 | 2013 | 2014 |
|----------|----------|------------|------------|
| 0 | 0 | 380 | 427 |

2-8. Breakdown of number of underground leakage detection by Acoustic rod, Leakage detector, Correlative leak detector, and other in 2011 (number)

地下漏水発見数の内訳: 音聴棒、漏水探知機、相関式探知機、その他

| Acoustic rod | Leakage detector | Correlative leak detector | Other |
|--------------|------------------|---------------------------|--------------------------|
| N/A | N/A | N/A | Helium Gas Method |

2-9. Number of reparation of leakage site (number / year) 年間漏水箇所修理数(箇所)

| 2011 | 2012 | 2013 | 2014 |
|----------|----------|------------|------------|
| 0 | 0 | 550 | 672 |

2-10. Average time to repair from leakage detection and the longest hours (hour)

漏水発見から修理までに要する平均時間(時間)

| Average | Longest |
|--------------------|----------------|
| 8 – 10 hour | 48 hour |

2-11. Number of leakage reports from public (number) 市民からの漏水の通報数(数)

| 2011 | 2012 | 2013 | 2014 |
|----------|----------|-------------|-------------|
| 0 | 0 | 1323 | 1737 |

2-12. Have you done Minimum Night Flow Measure method? 夜間最小流量測定を行ったことがあるか?

| |
|------------|
| Yes |
|------------|

3. Equipment of Leakage Detection 漏水調査機材

3-1. Number of Acoustic rod/bar and Amplified acoustic rod (number)

単純アンプ内蔵型/アンプ内蔵型音聴棒の本数(数)

| Acoustic rod/bar | Amplified acoustic rod |
|------------------|------------------------|
| Nil | Nil |

**HELIUM GAS METHOD IS
BEING USED IN WASA FSD**

3-2. Number of set of Correlative leak detector (number) 相関式漏水探知機のセット数(数)

| |
|------------|
| Nil |
|------------|

3-3. Number of set of Leak zone detector or Leak noise correlator (number)

音圧式漏水探知機のセット数(数)

| |
|----------|
| 5 |
|----------|

3-4. Number of sensor of Leak zone detector or Leak noise correlator (number)

音圧式漏水探知機のセンサー数(数)

5

3-5. Number of Metal pipe locator (number) 金属管探査機の台数(数)

Nil

3-6. Number of Resin pipe locator (number) 樹脂管探査機の台数(数)

Nil

3-7. Number of Distance measuring equipment (number) 距離測定装置の台数(数)

Nil

3-8. Number of Water meter measuring for MNFM (number) 夜間最小流量測定用水量メータの台数(数)

Nil

3-9. Number of vehicles used for leakage survey (number) 漏水対策に用いる車両台数(台)

3

3-10. Name of other leakage detector その他の漏水探知機

Helium Gas Method Used.

4. Water Distribution Analysis 配水量分析

Data in this table is 20___. 下表のデータは 20__ 年の水量。

| | | | | | |
|---|--|--|---|---|--------------|
| System Input Volume 配水量 93.5 MGD | Authorized Consumption 認定使用水量 62.7 MGD | Revenue Water 有収水量 66.1% | Billed Authorized Consumption 請求消費量 | Billed Metered Consumption (including water exported) 検針による料金徴収 | 0% |
| | | | 61.7 MGD | Billed Non-metered Consumption 検針に拠らない料金徴収 | 100% |
| | | | Unbilled Authorized Consumption 非請求消費量 | Unbilled Metered Consumption 請求せず(検針あり・調停) | 0% |
| | | | 0.94 MGD | Unbilled Non-metered Consumption 請求せず(検針なし・事業用) | 1% |
| | Water Losses 損失水量 30.8 MGD | Non-Revenue Water (NRW) 無収水量 32.9% | Apparent Losses 商業的(見かけ) 損失量 | Unauthorized Consumption 不正規消費(盗水・不明水) | 329% |
| | | | 14.76 MGD | Metering Inaccuracies 水道メーター検針エラー | 100% |
| | | | Real Losses 実質損失量 16.1 MGD | Leakage on Transmission and/or Distribution Mains 総配水管からの漏水 | 0.25% |
| | | | | Leakage and Overflows at Utilities Storage Tanks 貯水槽からの溢水、漏水 | 0.2% |
| | | | | Leakage on Service Connections up to Customers' Meters 戸別メータまでの給水管からの漏水 | N/A |

4-11. Distributed Water (million m³ / year) 年間総配水量(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|------------------------------|-----------------------------|-----------------------------|------------------------------|
| 113.664 m³ | 146.85 m³ | 146.85 m³ | 155.146 m³ |

4-12. Water tariff (Revenue Water) (million m³ / year) 水道料金対象水量(有収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|----------------------------|---------------------------|----------------------------|-----------------------------|
| 74.26 m³ | 96.1 m³ | 96.53 m³ | 102.38 m³ |

4-13. Other (Revenue Water) (m³ / year) その他の徴収料金対象水量(有収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|------------|------------|------------|------------|
| Nil | Nil | Nil | Nil |

4-14. Meter loss (Non-Revenue Water) (m³ / year) 水道メータ損失水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|------------|------------|------------|------------|
| Nil | Nil | Nil | Nil |

4-15. Stolen water (Non-Revenue Water) (million m³ / year) 盗水損失水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|----------------------------|---------------------------|----------------------------|----------------------------|
| 49.91 m³ | 48.0 m³ | 50.65 m³ | 51.14 m³ |

4-16. Unpaid water (Non-Revenue Water) (million m³ / year) 未納水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|----------------------------|----------------------------|----------------------------|----------------------------|
| 25770 m³ | 25770 m³ | 25770 m³ | 25770 m³ |

4-17. Leakage water (Non-Revenue Water) (million m³ / year) 漏水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|---------------------------|---------------------------|----------------------------|---------------------------|
| 13.8 m³ | 22.1 m³ | 22.85 m³ | 24.5 m³ |

4-18. Waterworks usage volume (Non-Revenue Water) (m³ / year) 水道工事使用水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|------------|------------|------------|------------|
| Nil | Nil | Nil | Nil |

4-19. Unknown water (Non-Revenue Water) (million m³ / year) 不明水量(無収水量) (m³/年)

| 2011 | 2012 | 2013 | 2014 |
|-------------------------|---------------------------|----------------------------|---------------------------|
| 14 m³ | 23.1 m³ | 23.75 m³ | 26.5 m³ |

4-20. Other (Non-Revenue Water) (m³ / year) その他の無収水量(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|------------|------------|------------|------------|
| Nil | Nil | Nil | Nil |

5. DMA / Leakage Survey Scale DMA/漏水調査メッシュ

5-1. To make up meshes or blocks for leak detection. (If make up meshes or blocks, DMA is replaced with the meshes or blocks.)

漏水調査用のブロックやメッシュを構成しているか(構成している場合は、以下のDMAは読み替える)

| |
|-----------|
| 88 |
|-----------|

5-2. Number of DMA block (number) DMAブロック数(数)

| |
|-----------|
| 16 |
|-----------|

5-3. Number of connection in DMA (connection) [Average of all DMA / Minimum / Maximum]

DMA内給水戸数(戸)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-------------|---------|------------|---------|--------------|
| Average | 8250 | Minimum | 929 | Maximum | 18354 |
|---------|-------------|---------|------------|---------|--------------|

5-4. Number of Hourly Factor in DMA [Average of all DMA / Minimum / Maximum]

DMA内時系数(ー)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/D | Minimum | N/D | Maximum | N/D |
|---------|-----|---------|-----|---------|-----|

5-5. Water supply average volume in DMA (m^3 / day) [Average of all DMA / Minimum / Maximum]

DMA内日平均給水量(m^3)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|--------------------------------------|---------|-------------------------------------|---------|--------------------------------------|
| Average | 25625 m^3 | Minimum | 6555 m^3 | Maximum | 48774 m^3 |
|---------|--------------------------------------|---------|-------------------------------------|---------|--------------------------------------|

5-6. Water supply maximum volume in DMA (m^3 / day) [Average of all DMA / Minimum / Maximum]

DMA内日最大給水量(m^3)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|--------------------------------------|---------|------------------------------------|---------|--------------------------------------|
| Average | 17164 m^3 | Minimum | 812 m^3 | Maximum | 33200 m^3 |
|---------|--------------------------------------|---------|------------------------------------|---------|--------------------------------------|

5-7. Water pressure in DMA (MPa) [Average of all DMA / Minimum / Maximum]

DMA内給水圧(MPa)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|------------------|---------|------------------|---------|------------------|
| Average | 0.031 MPa | Minimum | 0.006 MPa | Maximum | 0.128 MPa |
|---------|------------------|---------|------------------|---------|------------------|

5-8. Number of valves formed DMA area (number) [Average of all DMA / Minimum / Maximum]

DMAを構成する(区切る)仕切弁数(数)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-------------|---------|------------|---------|-----------|
| Average | 7.87 | Minimum | 1.0 | Maximum | 27 |
|---------|-------------|---------|------------|---------|-----------|

5-9. Number of valves in DMA (number) [Average of all DMA / Minimum / Maximum]

DMA内仕切弁数(数)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-------------|---------|------------|---------|-----------|
| Average | 3.75 | Minimum | 1.0 | Maximum | 12 |
|---------|-------------|---------|------------|---------|-----------|

5-10. Number of hydrant in DMA (number) [Average of all DMA / Minimum / Maximum]

DMA内消火栓数(数)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|--------------|---------|------------|---------|------------|
| Average | 0.625 | Minimum | 0.0 | Maximum | 2.0 |
|---------|--------------|---------|------------|---------|------------|

5-11. Size of mesh (If make up meshes or blocks) (km x km)

漏水調査用メッシュがある場合、メッシュの大きさ(km × km)

| |
|------------|
| N/A |
|------------|

5-12. Number of valve in distribution network (number) 総仕切弁数(数)

| |
|-----------|
| 88 |
|-----------|

5-13. Number of hydrant in distribution network (number) 総消火栓数(数)

| |
|-----------|
| 10 |
|-----------|

5-14. Number of another valve in distribution network (number) その他の調整弁等の総数(数)

| |
|-----------|
| 45 |
|-----------|

5-15. Number of water suspension (number / year) 年間断水回数(数/年)

| |
|--------------------------|
| Nil number / year |
|--------------------------|

5-16. The total number of connection of water suspension (connection / year) 年間断水のべ戸数(戸/年)

| |
|------------|
| Nil |
|------------|

5-17. Water suspension time per one time (hour / time) [Average / Maximum]

断水1回当たりの継続時間(時間/回)[平均/最大]

| | | | |
|---------|------------|---------|------------|
| Average | Nil | Maximum | Nil |
|---------|------------|---------|------------|

5-18. Describe the leakage repair flowchart 漏水修繕フロー図の記述

| |
|--|
| <p>Identification of Leakage → Excavation → Repair → Testing → Backfilling</p> |
|--|

6. Distribution pipeline laying 管路布設

6-1. New installation pipeline length (km) 新規布設管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|-----------------|-----------------|--------------|-----------------|
| 25.00 km | 29.58 km | 32 km | 33.86 km |

6-2. Replacement pipeline length (km) 送配水管更新(入替)延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------------|--------------|-----------------|--------------|
| 77 km | 68 km | 63.67 km | 52 km |

6-3. Rehabilitation pipeline length (km) 更生管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|------------|------------|------------|------------|
| Nil | Nil | Nil | Nil |

6-4. Removal pipeline length (km) 撤去管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|------------|------------|------------|------------|
| Nil | Nil | Nil | Nil |

6-5. Suspended pipeline length (km) 休止管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|------------|-------------|---------------|---------------|
| Nil | 3 km | 4.5 km | 2.5 km |

7. Distribution / Service Pipe material 送配給水管種別

7-1. Ductile Iron Pipe (DIP) length (km) ダクタイル鉄管(DIP)延長(km)

| Distribution | Nil | Service | 34.6 km |
|--------------|------------|---------|----------------|
|--------------|------------|---------|----------------|

7-2. Cast Iron Pipe (CIP) length (km) 鋳鉄管(CIP)延長(km)

| Distribution | 4.18 Km | Service | 1.92 km |
|--------------|----------------|---------|----------------|
|--------------|----------------|---------|----------------|

7-3. Steel Pipe (SP) length (km) 鋼管(SP)延長(km)

| Distribution | Nil | Service | 1.0 km |
|--------------|------------|---------|---------------|
|--------------|------------|---------|---------------|

7-4. Stainless Steel Pipe (SUS) length (km) ステンレス鋼管(SUS)延長(km)

| Distribution | Nil | Service | Nil |
|--------------|------------|---------|------------|
|--------------|------------|---------|------------|

7-5. Concrete (Hume) Pipe (HP) length (km) コンクリート管(HP)延長(km)

| Distribution | Nil |
|--------------|------------|
|--------------|------------|

7-6. Asbestos Cement Pipe (ACP) length (km) アスベスト管(ACP)延長(km)

| Distribution | 1199.75 Km | Service | 94.45 km |
|--------------|-------------------|---------|-----------------|
|--------------|-------------------|---------|-----------------|

7-7. Polyvinyl Chloride Pipe (PVC) length (km) 硬質塩化ビニル管(PVC)延長(km)

| | | | |
|--------------|----------------|---------|------------|
| Distribution | 8.27 Km | Service | Nil |
|--------------|----------------|---------|------------|

7-8. High Impact Vinyl Pipe (HIVP) length (km) 高強度塩化ビニル管(HIVP)延長(km)

| | | | |
|--------------|------------|---------|------------|
| Distribution | Nil | Service | Nil |
|--------------|------------|---------|------------|

7-9. Polyethylene Pipe (PEP) length (km) ポリエチレン管(PEP)延長(km)

| | | | |
|--------------|------------|---------|------------------------------|
| Distribution | Nil | Service | 104. 63 km (20mm dia) |
|--------------|------------|---------|------------------------------|

7-10. Galvanized Steel Pipe (GP) length (km) 亜鉛メッキ鋼管(GP)延長(km)

| | | | |
|--------------|------------|---------|------------|
| Distribution | Nil | Service | Nil |
|--------------|------------|---------|------------|

7-11. Lead Pipe (LP) length (km) 鉛管(LP)の延長(km)

| | | | |
|--------------|------------|---------|------------|
| Distribution | Nil | Service | Nil |
|--------------|------------|---------|------------|

7-12. Copper Pipe (CP) length (km) 銅管(CP)の延長(km)

| | |
|---------|------------|
| Service | Nil |
|---------|------------|

7-13. Other Pipe length (km) その他の管の延長(km)

| Pipe material name | Distribution | Service |
|--------------------|---------------|---------|
| HDPE | 6.5 km | km |

7-14. Transmission Pipeline length (km) 送水管延長(km)

| | | | |
|------------------|----------------|------------|------------|
| 1987-1992 | 2012 | 2013 | 2014 |
| 66.3 km | 34.6 Km | Nil | Nil |

7-15. Distribution Pipeline length (km) 配水管延長(km)

| |
|--------------------|
| 1982 – 2014 |
| 1218.5 km |

7-16. Service Pipeline length (km) 給水管延長(km)

| |
|--------------------|
| 1982 – 2011 |
| 202 km |

8. SCADA/Mapping system 水道情報データ管理／マッピングシステム

8-1. Describe the name of digital data filing 電子データ化している業務名

Software Data Filing “TOP KAPPI”

8-2. Proportion of filing system of business management document (%) 事業文書の管理割合(%)

| Paper filing | Digital filing |
|--------------|----------------|
| 0% | 100% |

8-3. Proportion of filing system of water facilities' drawing (%) 水道工事図面の管理割合(%)

| Paper filing | Digital filing |
|--------------|----------------|
| 0% | 100% |

9. Water meter and maintenance 水道メータ・修繕

9-1. Number of installed water meter (number) 水道メータ設置数(数)

| Diameter | 13mm | 20mm | 25mm | mm | mm | Other | Total |
|----------|------------|------|------|----|----|-------|-------|
| Number | Nil | | | | | | |

9-2. Period of service of water meter (year) 水道メータ使用期間(年)

N/A

9-3. Number of annual purchase of water meter (number) 水道メータ年間購入数(数)

| 2011 | 2012 | 2013 | 2014 |
|--|------|------|------|
| 1) 20,000 water meters will be installed up to 2015. 2) PC-I of worth Rs.1052 million has been processed in this financial year for installation of water meters. | | | |

9-4. Times of usage of maintained expiry water meter (times)

満期水道メータの修理後の繰り返し使用回数(回)

Nil

9-5. Number of damaged water meter (number) 破損水道メータ数(数)

| 2011 | 2012 | 2013 | 2014 |
|------------|------------|------------|------------|
| Nil | Nil | Nil | Nil |

9-6. Number of intentional damaged water meter (number) 故意に破損された水道メータ数(数)

| 2011 | 2012 | 2013 | 2014 |
|------------|------------|------------|------------|
| Nil | Nil | Nil | Nil |

9-7. Describe the reason of damaged/broken water meter 水道メータの破損理由の記述

Nil

10. Procurement / Stock management 資材調達・資材管理

10-1. Describe the procedure of procurement of water supply material 材料調達手段の記述

- ❖ **Material demand / requirement**
- ❖ **Preparation of estimate as per demand**
- ❖ **Technical Sanction (TS)**
- ❖ **Tendering**
- ❖ **Evaluation of Bids**
- ❖ **Issuance of Acceptance**

10-2. Describe the management of spare parts 予備材料の管理方法

Stock register of spare parts is being maintained by Store Keeper.

Remarks:

Transmission pipeline defines the pipeline between water treatment plant and distribution reservoir, also between two distribution reservoirs.

DMA defines District Metered Area as same as District Metered Zone (DMZ).

The Hourly Factor defines non-dimension value which hourly maximum consumption volume divides hourly average one.

If no data, answer is "N/D", else if no answer or non-applicable, answer is "N/A".

Pressure unit:

| | MPa | kgf/cm ² | Bar | PSI |
|---------------------|--------|---------------------|--------|-------|
| MPa | 1 | 10.20 | 9.869 | 145.0 |
| kgf/cm ² | 0.0981 | 1 | 0.9678 | 14.22 |
| Bar | 0.1013 | 1.033 | 1 | 14.70 |
| PSI | 0.0069 | 0.0703 | 0.0680 | 1 |

Questionnaire on the Water Supply Business

Questionnaire 3: Tube Well

Name of organization: **Water Resources Directorate WASA Faisalabad**

Please provide data for tube well as follows:

Q1 How many tube wells are there in your town?

Q2 Do you have the inventory of tube well ?

Q3 Do you have information of each tube well regarding well location, installation year, screen depth, maintenance record, operational hours, specification of pumps ?

Answer of Q1 to Q3:

❖ 29 Nos. Tube-wells at Well-field Area Chiniot

- Installation Year = 1987-1992
- Capacity = 4 cusec each
- Screen Depth = 390' – 500'
- Operational hours = 14 to 16 hours/day

❖ 25 Nos. Tube-wells along Jhang Branch Canal

- Installation Year = 2010-2012
- Capacity = 2 cusec each
- Screen Depth = 387' – 500'
- Operational hours = 12 to 14 hours/day

❖ 23 Nos. Tube-wells along Rakh Branch Canal

- Installation Year = 1986 – 2004, 2010 – 2012
- Capacity = 01 cusec each
- Screen Depth = 140' – 160'
- Operational hours = 6 to 7 hours/day

Note:

The Remaining information about Tube-wells is attached at Annex – “B”.

Questionnaire on the Water Supply Business

Questionnaire 4: Sewerage and Drainage

Name of organization: **WATER AND SANITATION AGENCY, FAISALABAD**

A. Documents or information related to sewerage and drainage system in WASAs

(1) Please provide following maps.

- | | |
|---|-----------|
| ➤ Location Plan of the City (including Area Boundary) | Annex-“C” |
| ➤ Topography and Levels | |
| ➤ Served and Unserved Areas | Annex-“D” |
| ➤ WASA administration Zones Boundary | Annex-“C” |
| ➤ Location of Disposal stations | Annex-“E” |
| ➤ Layout Plan of Existing Sewer System | Annex-“D” |
| ➤ Layout Plan of Existing Drainage System | Annex-“F” |
| ➤ Existing Drainage Route and Point of Final Disposal | Annex-“F” |
| ➤ Proposed or planed Sewers and Drainages System | Annex-“D” |
| ➤ Major Ponding Areas | Annex-“G” |

(2) Please provide following rainfall data.

- | | |
|--|-----------|
| ➤ Rainfall intensity (15, 30, 60 120 minutes, 3,6,9,12 hours duration) | Annex-“H” |
| ➤ Fitted Intensity Duration Curve | N/D |

B. Organization and finance

(1) Please provide an actual organization chart of WASAs especially Sewers and Drainages cleaning (Engineers, Equipment operators, Sewer man, etc)

Attached at Annex – “J”

(2) Please furnish an annual budget and disbursement in the WASAs and its breakdown for the last 5 years especially Sewers and Drainages cleanings.

Attached at Annex – “K”

(3) Please explain the schedule and budget allocation for the implementation of the cleanings (operation/maintenance of the sewage and drainage system).

Attached at Annex – “K”

C. Equipment/Machinery

- (1) Please provide a list of equipment/machinery owned by WASAs as tabulated below (type of equipment, model, year of manufacturing, name of manufacturer and country, running hour/km, working condition, maintenance method, present location).

| Equipment | Model (Main Spec.) | Year | Manufacturer/ Country | Running hour/km | Working Condition | Maintenance method | Location |
|--------------------|-----------------------|------|--------------------------|--------------------|----------------------|-----------------------|------------|
| Wheel Excavator | PC200 | 1998 | Komatsu Japan | 6000hr | Under repair | Need overhaul | Motor pool |

Attached at Annex-“M”

- (2) Existing facilities or equipment for maintenance service available at the workshop of WASAs.
- (3) Procedure of machine maintenance and process of daily/routine maintenance activity and preparation of activity's record/report.
- (4) Laws/Regulations of gas emission control for vehicles and construction equipment.
- (5) Average field working hours per day for Sewers and Drainages cleanings.
- (6) Current dredging method.
(E.g. one excavator/clamshell + two dump trucks of 10 ton load capacity)
- (7) Current sludge removal work from sewage pipes.
(E.g. one worker in manhole + one dump trucks of 2 ton load capacity)
- (8) Record of the accidents of construction equipment/machinery for the last 5 years
(E.g. overhead wire cutting, fall to channel, fuel shortage etc.)
- (9) With regard to disposal stations, the following information will be required (refer to Format-1):

- Name of disposal stations
- Pump Type
- Capacity of each pump (flow rate)
- Operation hours per day
- Status of pump
- Established Year
- Pump quantity
- Motor Power
- Total capacity of disposal station (flow rate)
- Final Discharge Point

Attached at Annex – “N”

Format-1

| No. | Name of Lift Station | Establis hed Year | Pump Type* ¹ | Number and Capacity of Pumps | | | | Motor Power (kw) | Opera- tion hour (hr/day) | Total Capacity | | Status of Pump | Final Discharge Point |
|-------------------|----------------------|-------------------|-------------------------|------------------------------|------|--------|--------|------------------|---------------------------|----------------|--------|----------------|-----------------------|
| | | | | (nos.) | (kw) | (m³/s) | (Cfs) | | | (m³/s) | | | |
| SHAHDARA WWT AREA | | | | | | | | | | | | | |
| 1 | Maqbra More | 1985 | H | 1 | x | 2 | (0.06) | | | 2 | (0.06) | ok | River Ravi |
| 2 | Barkat Town | 1989 | H | 1 | x | 4 | (0.12) | | | 7 | (0.21) | ok | Farakhabad DS |
| | | | H | 1 | x | 3 | (0.09) | | | | | | |
| 3 | Shahdara | 1990 | H | 4 | x | 6 | (0.17) | | | 24 | (0.68) | ok | River Ravi |
| 4 | Saeed Park | 1995 | H | 1 | x | 4 | (0.12) | | | 7 | (0.21) | ok | River Ravi |

| No. | Name of Lift Station | Established Year | Pump Type* ¹ | Number and Capacity of Pumps | | | Motor Power (kw) | Operation hour (hr/day) | Total Capacity | | Status of Pump | Final Discharge Point |
|--------------------------|----------------------|------------------|-------------------------|------------------------------|---|---------------------|------------------|-------------------------|----------------|---------------------|----------------|-----------------------|
| | | | | (nos.) | | (m ³ /s) | | | (Cfs) | (m ³ /s) | | |
| | | | H | 1 | x | 2 (0.06) | | | | | | |
| | | | H | 1 | x | 1 (0.03) | | | | | | |
| 5 | Faisal Park | 1995 | H | 1 | x | 2 (0.06) | | | 5 | (0.15) | ok | Irrigation |
| | | | S | 1 | x | 2 (0.06) | | | | | | Distributary |
| | | | H | 1 | x | 1 (0.03) | | | | | | |
| 6 | Fazal Park | 1996 | H | 2 | x | 6 (0.17) | | | 18 | (0.4) | ok | River Ravi |
| | | | S | 1 | x | 4 (0.12) | | | | | | |
| | | | S | 1 | x | 2 (0.06) | | | | | | |
| MEHMOOD BOOTI WWT | | | | | | | | | | | | |
| 7 | Madina | 2008 | S | 3 | x | 10 (0.29) | | | 38 | (1.11) | ok | Shalimar Escape |
| | | | S | 2 | x | 4 (0.12) | | | | | | Drain |
| 8 | Dars Baray | 1982 | H | 2 | x | 2 (0.06) | | | 4 | (0.12) | ok | Shalimar Escape |
| 9 | Toheed Park | 1992 | H | 2 | x | 2 (0.06) | | | 4 | (0.12) | ok | Shalimar Escape |
| 10 | Shah Kamal | 1992 | H | 2 | x | 2 (0.06) | | | 4 | (0.12) | ok | Shalimar Escape |
| 11 | Shalimar Link | 1984 | H | 3 | x | 6 (0.17) | | | 18 | (0.51) | ok | Shalimar Escape |
| 12 | Lal Pul | 1998 | S | 3 | x | 2 (0.06) | | | 20 | (0.47) | ok | Shalimar Escape |
| | | | S | 1 | x | 4 (0.12) | | | | | | Drain |
| | | | H | 1 | x | 4 (0.12) | | | | | | |
| | | | H | 1 | x | 6 (0.17) | | | | | | |
| 13 | Fayaz Park | 2001 | S | 1 | x | 2 (0.06) | | | 6 | (0.12) | ok | Shalimar Escape |
| | | | H | 1 | x | 2 (0.06) | | | | | | Drain |
| | | | H | 1 | x | 2 (0.06) | | | | | | |
| 14 | Taj Bagh | 2008 | S | 2 | x | 6 (0.17) | | | 12 | (0.34) | ok | Shalimar Escape |
| 15 | B-Block | 2008 | S | 1 | x | 4 (0.12) | | | 10 | (0.29) | ok | Shalimar Escape |
| | | | S | 1 | x | 6 (0.17) | | | | | | Drain |
| 16 | Tajpura Main | 1990 | S | 1 | x | 25 (0.71) | | | 75 | (2.13) | ok | Shalimar Escape |
| | | | H | 2 | x | 25 (0.71) | | | | | | Drain |

Note: *1 V:Vertical Axial Flow Pump, H:Horizontal Axial Flow Pump, S:Submersible Pump

Questionnaire on the Water Supply Business

Questionnaire 5-Faisalabad

Management, Finance and Organization

Name of organization: **Faisalabad WASA**

1) Management

Please answer the following questions and provide financial reports in recent three (3) years, current tariff tables and your organization chart to support your answers.

| | Questions | Please write your answers. | Reference document |
|---------------------------------|--|---|------------------------------|
| Vision, strategy | Existence of a long-term-plan | Answer: Yes comments: (A long term plan was created in 1976, subsequently updated in 1993 and is valid upto 2018) | WASA Master Plan |
| Finance | Revenues: | Year 2012 actual(), 2013 actual(), 2014 actual (), 2015 estimated (), 2016 planning () | N/D |
| | Costs | Year 2012 actual (), 2013 actual (), 2014 actual (), 2015 estimated (), 2016 planning () | N/D |
| | Investment | Year 2012 actual (), 2013 actual (), 2014 actual (),2015 estimated (),2016 planning () | N/D |
| | Main finance sources | What is your main finance source, e.g. water charge collection, subsidy, government finance (PC-1), assistance from donors? Answer () | N/D |
| Future expansion | What is your future expansion plan? New water treatment plant () New sewage plant () Rehabilitation () How much do you need to implement the above plans? () | | N/D |
| Administration and organization | Organization! chart | Number of staff in each division by grade. | Enclosed as Annex-“P” |
| | Recruitment | Year 2012 actual (13), 2013 actual (11),2014 actual (22),2015 estimated (85),2016 planning () | |
| | Retirement | Year 2012 actual (50), 2013 actual (51), 2014 actual (61), 2015 estimated (41), 2016 planning (20) | |

| | | | |
|----------|----------------------------------|---|-----------------------------------|
| | Communication among divisions | Do you have a regular cross-division meeting (e.g. once a month, once a week)? Answer (Daily meeting held between all Directorates, chaired by MD WASA) | |
| | Pipe distribution network map | Do you have a pipe distribution network map of your city? Answer: Yes, No, Comments () | N/D |
| | Inventory List | Do you have a list of inventory, machinery and other fixed assets? Answer: Yes | |
| | Customer database | Do you have a customer database? Answer: Yes | |
| Training | Training program (actual) | What training have you conducted? Answer (28 in house training have been conducted during last three years) | List enclosed at Annex-“Q” |
| | Necessary Training in the future | What training do you need in the future? Answer: Training pertaining to Water Supply/ Sewerage design, operation, maintenance, HR Management, Financial Management, IT along with soft trainings are needed. | |
| | Guidelines | Do you have textbooks or guidelines to give a lecture to your staff? Answer: Yes Comments (Books and manuals relating to engineering/technical side are available to certain extent. Material relevant to HR & Finance is deficient). | |
| | Budget for the training | How much is your annual budget for the training? Answer (2 – Lac) | |

| | | | |
|--|--|---|--|
| Relation with customers | Communication with customers | Do you have a regular meeting with customers (e.g. once a month, once a week)? Answer: Yes Comments (Citizen Liaison Cell has been established in WASA solely for this purpose) | |
| | Complaints from customers | Do you keep recording customer complaints? Answer: Yes Comments (Customers Relation Center has been established in WASA to address and keep record of consumer complaints) | |
| Relation with other organizations: WASAs, Government, and donors | Relation with other WASAs, suppliers | Do you have a regular meeting with other WASAs or suppliers (e.g. once a month, once a week)? Answer: Yes Comments (Regular meetings are held at the forums of Housing Department, Government of the Punjab and Pakistan Water Operators Network) | |
| | Relation with the State Government | Do you have a regular meeting with the State Government (e.g. once a month, once a week)? Answer: Yes Comments (Meetings with Government are held occasionally as and when intimated by Housing Department) | |
| | Relation with Tehsil Municipal Administrations | Do you provide some training for Tehsil Municipal Administrations? Answer: No | |

2) Water supply

The IBNET is International Benchmarking Network for Water and Sanitation Utilities, issued by the World Bank. I would appreciate if you answer the following questions, in reference to the data as of year 2010 on the web or data from the JICA report in July 2014.

| Questions | Year 2006 data | Year 2010 data | Source | Please write current situations. |
|---|-------------------|--------------------|--------|----------------------------------|
| Faisalabad population | 2,660,000 | 3,000,000 | IBNET | 32,00,000 |
| Coverage with water service | 60.23% | 50.00% (1,500,000) | IBNET | 60% |
| Coverage with sewerage | 65.53% | 70.0% | IBNET | 73% |
| Water treatment capacity (m3/day) | | | N/A | 20,457.4 m3/day |
| Actual average treatment volume (m3/day) | | | N/A | 15911.3 m3/day |
| Number of connections | | 110,000 | IBNET | 1,12,081 Nos. |
| Network length (km) | | 1,457 | IBNET | 1487 km |
| Water production | 184.70 lpcd | 157.08 lpcd | IBNET | 221.3 lpcd |
| Total water consumption | 124.84 lpcd | 138.81 lpcd | IBNET | 148.5 lpcd |
| Residential consumption | 95.89 lpcd (2008) | 111.42 lpcd | IBNET | 135 lpcd |
| Losses in m3/km of the network a day | 73.71 m3/ km | 18.80 m3/km | IBNET | 94.16 m3/ km |
| Losses in % | 32.41% | 11.63% | IBNET | 32.90% |
| Revenues, US\$, Rs per M3 sold | 0.11 \$ | 0.14 \$ | IBNET | 0.14 \$ |
| Costs, US\$ per M3 sold | 0.10 \$ | 0.10 \$ | IBNET | 0.094 \$ |
| Operation cost coverage | 1.17 | 1.31 | IBNET | 1.001 |
| Revenue collection ratio | 48.12% (2007) | 52.23% | IBNET | 63.91% |
| Labor costs vs. operation costs | | 46% | IBNET | 55% |
| Electrical energy costs vs. operation costs | | 44% | IBNET | 39.46% |
| Contracted or service costs vs. operation costs | | 10% | IBNET | 6.68% |

| | | | | |
|------------------------------------|--|---|------|-----------------------------------|
| Total staff number | | 2,632 staff (2011) | JICA | 521 of water Directorate |
| Staff per 1,000 connections | | 23.9 staff per 1,000 connections (2011) | JICA | 4.59 |
| Water supply hours a day | | 7 hours a day (2011) | JICA | 6 – 7 |
| Water meter installation ratio | | 1.47% (2011) | JICA | Nil |
| Average monthly tariff | | 292 Rs (2011) | JICA | Copy attached at Annex-“A” |
| Revenue collection ratio | | 86% (2011) | JICA | |
| New connection installation fee | | 483 Rs (2011) | JICA | |
| Annual costs per a connection (Rs) | | 2,687 Rs (2011) | JICA | |
| Annual Complaints | | 24,911 complaints (2011) | JICA | 4380 |

3) Sewage

| Questions | Year 2011 data | Source | Please write current situations. |
|---------------------------------------|----------------------------------|-------------|---|
| Coverage with sewage | 70% | JICA report | 73% |
| Sewage capacity (m3/day) | | N/A | 335 MGD |
| Actual average sewage volume (m3/day) | | N/A | 280 MGD |
| Sewage network length (km) | 1,711 km | JICA | 1,711 km |
| Drainage network length (km) | 62 km | JICA | 62 km |
| Drainage pump stations | 34 Stations | JICA | 38 Nos. |
| Sewage plants | 91,000 m3/day, planning 3 plants | JICA | 91,000 m3/day, planning 3 plants |

Thank you for your answers.

List of Annexures

Faisalabad

| | |
|------------|---|
| Annexure A | Questionnaire 1, Question 4.1 & 4.4 WASA, Water Tariffs |
| Annexure B | Questionnaire 3, Question 3 Existing Water Supply Sources |
| Annexure C | Questionnaire 4, Question A Location Plan of the City (Including Area Boundary) WASA Administration Zones Boundary |
| Annexure D | Questionnaire 4, Question A (1) Served & Unserved Areas Layout Plan of Existing Sewer System Proposed or Planned Sewers & Drainages System |
| Annexure E | Questionnaire 4, Question A (1) Location of Disposal Stations |
| Annexure F | Questionnaire 4, Question A (1) Layout Plan of Existing Drainage System Existing Drainage Route & Point of Final Disposal |
| Annexure G | Questionnaire 4, Question A (1) Major Ponding Areas |
| Annexure H | Questionnaire 4, Question A (2) Rainfall Intensity |
| Annexure J | Questionnaire 4, Question B (1) Organization Chart |

| | |
|------------|--|
| Annexure K | Questionnaire 4, Question B (2 & 3) Annual Budget |
| Annexure M | Questionnaire 4, Question C (1) Equipment/ Machinery |
| Annexure N | Questionnaire 4, Question C (9) Disposal Stations in WASA, Faisalabad |
| Annexure P | Questionnaire 5, Question 1 Number of Staff in each Division by Grade |
| Annexure Q | Questionnaire 5, Question 1 Professional Training of WASA Staff |



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NOTIFICATION

No. _____ DDR (D)/WASA/FDA/2006/6502

DATED:09/12/2006

The Governing Body of Faisalabad Development Authority held its 73rd meeting on 29-11-2006 under the Chairmanship of District Nazim, Faisalabad city duly attended by elected Town Nazims of Faisalabad city and Representatives of Secretaries, Govt: of the Punjab, Housing, Urban Development & Public Health Engineering Department, Finance Department and Planning & Development Department. The House exercising its powers delegated under Sections 27 & 28 of Punjab Development of Cities Act 1976 and under Section 27, Sub Section (1) of Punjab Development of Cities (Amendment) Ordinance 2006 unanimously approved increase in tariff by 15% effective from 1st January 2007 as under: -

TARIFF FOR WATER SUPPLY

(Rate in rupees)

i) Domestic connection without meter (1/4" ferrule size)

| <u>S.No.</u> | <u>Plot size</u> | <u>Rate per Month per connection</u> |
|--------------|------------------------------|--------------------------------------|
| 1. | Up to 2.5 Marla | 83.00 |
| 2. | Above 2.5 Marla to 3.5 Marla | 124.00 |
| 3. | Above 3.5 Marla to 5 Marla | 145.00 |
| 4. | Above 5 Marla to 10 Marla | 242.00 |
| 5. | Above 10 Marla to 20 Marla | 322.00 |
| 6. | Above 20 Marla to 40 Marla | 644.00 |
| 7. | Above 40 Marla | 966.00 |

Note:-

- i) The domestic connections of 1/2" i/d ferrule size will be charged double of above rates.

- ii) The above-mentioned Water supply rates on area basis will be charged up-to three stories. On above, 33.33% of the rate will be charged to each story

ii) **Domestic Metered Connections** **Rate per Thousand Imperial Gallons/ Per Connection.**

| | |
|--|-------|
| Less than 5000 imperial gallons per month use | 39.00 |
| From 5000 Imperial gallons to 10000 Imperial Gallon per month use. | 40.00 |
| Above 10000 Imperial gallons per month use | 48.00 |

iii) **Without Meter Connection (1/4" ferrule size),**
For industrial, Commercial and other non-residential properties etc.

| <u>S. No</u> | <u>Plot size</u> | <u>Per Month Rate</u> |
|--------------|----------------------------|-----------------------|
| 1. | UP to 3 Marla | 322.00 |
| 2. | Above 3 Marla to 6 Marla. | 483.00 |
| 3. | Above 6 Marla to 10 Marla | 805.00 |
| 4. | Above 10 Marla to 20 Marla | 1288.00 |
| 5. | Above 1 Kanal to 2 Kanal. | 2415.00 |
| 6. | Above 2 Kanal. | 3220.00 |

iv) **Industrial, Commercial and Other Non-Residential Metered Connections etc.**

| | <u>Per Month Rate</u> |
|---|-----------------------|
| Per thousand Imperial gallons per connection. | 53.00 |

Note:-

In case of defective meter, consumer will be charged at average bill for the last twelve months and in case of temporary disconnection, consumer have to pay minimum 15% of the three months average bill and also the consumer has to inform WASA in advance accordingly within 24 hours.

v) **Above 1/4" ferrule size Industrial and Commercial water Connection**
Without meter.

| <u>S/NO</u> | <u>Plot size</u> | <u>Per Month Rate</u> |
|-------------|--|-----------------------|
| 1. | 1/2" Ferrule size less than 10 Marla. | 1610.00 |
| 2. | 1/2" Ferrule size 10 Marla to 20 Marla | 2576.00 |
| 3. | 1/2" Ferrule size Above 20 Marla | 4025.00 |

vi) **Industrial, Commercial and Non-Residential connections (without meter)**

| <u>S.No.</u> | <u>Ferrule size</u> | <u>Per Month Rate</u> |
|--------------|---------------------|-----------------------|
| 1. | 3/4"(0.75") | 5175.00 |
| 2. | 1" | 5750.00 |
| 3. | 1.5" | 9660.00 |
| 4. | 2" | 19320.00 |
| 5. | 3" | 48300.00 |
| 6. | 4" | 96600.00 |

7. 6"

322000.00

Note:- More than 6" connection size, the rate will be charged as per below mentioned Formula $[(6") \text{ size per month rate} \times D \times D \times 4]$. The "D" is the internal dia of the Connection size in feet.

vii) **The Government Registered Religious/Charitable Units/Departments and Mosque will be charged, 70% of domestic rates.**

2. i) **Domestic Sewer/Drainage connection**

| <u>S. No</u> | <u>Plot size</u> | <u>Per Month Rate</u> |
|---------------------|------------------------------|------------------------------|
| 1. | Up to 2.5 Marla | 55.00 |
| 2. | Above 2.5 Marla to 3.5 Marla | 83.00 |
| 3. | Above 3.5 Marla to 5 Marla | 97.00 |
| 4. | Above 5 Marla to 10 Marla | 161.00 |
| 5. | Above 10 Marla to 20 Marla | 242.00 |
| 6. | Above 20 Marla to 40 Marla | 403.00 |
| 7. | Above 40 Marla | 644.00 |

Note:-

- The above-mentioned sewer/drainage rates on area basis will be charged upto three Stories. On above, 33.33% of the rate will be charged to each story.
- The domestic users disposing water/used water into WASA channels through Open drains will be charged at the rate 70% of sewerage service charges w.e.f. 01/07/2004 till provision of sewerage piping network.

ii) **Government Registered Religious/Charitable Units/Departments and Mosques will be charged, the 70% of domestic rates.**

iii) **Commercial Sewer /Drainage Charges**

| <u>S. No</u> | <u>Particulars</u> | <u>Per Month Rate</u> |
|---------------------|--|------------------------------|
| 1. | Shop. Shopping Centers. Departmental Stores, Multi Story Shops and Arcades per point having one Toilet/Wash Basin/Sink/Tap etc. | 121.00 |
| 2. | (i) Hotel etc. per Bed/Bath/Bed Room/Tap Wash Basin/Toilet/Sink/Point etc. (ii) Restaurant per Wash Basin/Sink /Toilet/Tap/Bed Room/Bath/Point etc. | 81.00 81.00 |
| 3. | Private Hospital, Clinic, Clinical Laboratories per Bed/Bath/Wash Basin/Sink/Tap/Point etc. (Which is excess, will be considered) | 58.00 |
| 4. | Car Service Station per Lift/Bay | 1449.00 |
| 5. | Motor Cycle service Station etc. | 201.00 |
| 6. | Hair Cutting Saloon, Beauty Parlor, Hamam etc. Per Bath/Wash Basin/Sink/Tap/point etc. | 58.00 |
| 7. | Multi Story Commercial Plaza,Banks and Marriage Hall (per 1000 Sft. Covered Area) | 403.00 |
| 8. | Government Offices (Per 1000 Sft Covered Area. | 201.00 |
| 9. | Private Education Deptts/Schools/Colleges /Institutions Universities etc. (per 1000 Sft. Covered Area) | 290.00 |
| 10. | Four Star & Five Star Hotels (Per Acre) | 3220.00 |
| 11. | Other Units /Departments not covered under above categories (per 1000 Sft. Covered Area) | 290.00 |

(iv) i. INDUSTRIAL

| <u>S. No</u> | <u>Particulars</u> | <u>Per Year/Per Sft. Covered Area</u> |
|--------------|---|---|
| a) | Limited Waste/Used Water Discharge Factories through Toilets/Sink/Point/Wash Basin) i.e. Calico Chemicals, Ice Factories, Cold Storage, Garments, Knitting & Stitching units Table Prints, Embroidery, Biscuit Factories, Goli Toffy Factories, Gatta/ Paper, Medicine, Small Chemical Units Air jet Hosiery except washing units, and other similar nature units etc. not covered under above units. | 3.50 |
| b) | Waste/Used Water Discharge of Small Units (through Toilet/Sink/Point Wash Basins etc.) i.e foundries, Paint Factories, Dal Factories, Soap Factories, Loom Factories (except washing, dying & Processing Hosiery) Pipe Factories, Oil mills, Pottery, works Factories, Sizing Factories, Plastic Factories, Godowns and other similar nature units not covered under above units. | 2.0 |

V.

| <u>(ii)</u> | <u>Bulk Waste/Used Water Discharge Units</u> | <u>Per Month (Per Cusic)</u> |
|-------------|---|----------------------------------|
| a) | Industrial units who are discharging the wastewater as per installed capacity/size. | 46,690.00 |

Note: Any closed unit, if wants relief must be closed for three months continuously.

3. Aquifer Charges (Fees on Tube Wells)

| <u>S. No</u> | <u>Units/Factories etc. (per Cusic/per Month)</u> | <u>Per Month (Per Cusic)</u> |
|--------------|---|----------------------------------|
| i) | Industrial, Commercial, Government, Semi Government, Corporation, Irrigation Departments. Semi/Independent Organization, Local Body Units and the Units who are getting water through tube-wells. (Rate will be charged according to the discharge size of the tube well/ pumps motors etc. | 12880.00 |
| ii) | Textile Processing and Hosiery units (getting water through tube well/ pumps motors, per month per cusec). | 10465.00 |

Note:

- (i) Those tube wells will be considered standby must be sealed by WASA and be connected with the single delivery system according to the approved/Paying discharges size, if any unit wants to use standby turbine after breaking the seal. That unit must inform WASA within 24 hours, otherwise it will be penalized.
- (ii) Aquifer charges are applicable on Pumps/Tubewells of on 2" and above capacity.

4. MISCELLANEOUS

Fee for new connection**i) Water connection (per connection)**

- | | | |
|----|----------------------------|-------------|
| a. | ¼" ferrule size. | Rs. 483.00 |
| b. | ½" ferrule size and above. | Rs. 3220.00 |

Note:- Consumer will provide all relative material himself for new connection.

ii) Sewer/Drainage per connection

- | | | |
|----|------------|-------------|
| a. | Domestic | Rs. 322.00 |
| b. | Commercial | Rs. 805.00 |
| c. | Industrial | Rs. 3220.00 |

Note:- Consumer will provide all relative material himself for new connection.

5. RE-OPEN/RE-CONNECTION FEE

- | | | |
|----|----------------------------|----------------------|
| a. | Water connection | ½ of connection fee. |
| b. | Sewer/drainage connection. | ½ of connection fee. |

Note:- Re-Connection fee is valid up to one year after disconnection and after that new connection will be provided on payment of due charges of new connection.

6. SECURITY**i) Water Supply, Sewer and Drainage.**

- | | | |
|----|------------|------------------------------|
| a. | Domestic. | Equal to three-month charge. |
| b. | Commercial | Equal to three-month charge. |
| c. | Industrial | Equal to three-month charge. |

Note:- The separate security charges will be paid, for water supply, sewer/drainage connections.

7. REGULARIZATION OF UN-AUTHORIZED / ILLEGAL WATER SUPPLY CONNECTION AND INSTALLATION OF COMMERCIAL /INDUSTRIAL TUBEWELLS AQUIFER CHARGES FOR COMMERCIAL PURPOSES, (Regularization fees)

- | | | |
|----|------------|------------------------------|
| a. | Domestic. | Rs. 483.00 per connection. |
| b. | Commercial | Equal to three-month charge. |
| c. | Industrial | Equal to three-month charge. |

Note:-

- i) No user is authorized to install water pump/motor on/ with WASA water supply network.
- ii) In case a regular consumer is detected committing any irregularity, the regularization fees shall be charged equal to three-month charges.

8. REGULARIZATION OF UN-AUTHORIZED ILLEGAL SEWERAGE / DRAINAGE CONNECTION. (Regularization fees)

- | | | |
|----|------------|------------------------------|
| a. | Domestic. | Rs322.00 per connection. |
| b. | Commercial | Equal to three-month charge. |
| c. | Industrial | Equal to three-month charge. |

Note:-

- iii) No user is authorized to discharge his effluent through force pumping.
- iv) In case a regular consumer is detected committing any irregularity, the regularization fees shall be charged equal to three-month charges.

9. INFRASTRUCTURE COST / DEVELOPMENT CHARGES FOR WATER SUPPLY SEWERAGE / DRAINAGE SYSTEM FOR PRIVATE COLONIES/ UNITS.

- a. If residents of private colony require to lay water supply and sewer/drainage system on self help basis, they shall pay Rs. 966.00 extra for each connection for water supply or sewerage/drainage separately as infrastructure cost/charges after getting approval from WASA.
- b. If WASA provides water supply, sewer/drainage facility in any private colony, the residents of the colony will pay extra Rs. 1288.00 per connection for water supply, sewer/drainage charges separately as infrastructure cost/charges other than the normal connection fee.
- c. For NOC from WASA, the private developers will pay Rs. 886.00 per Marla as infrastructure cost/charges each for water supply and sewer/ drainage system on the saleable area except the Roads, Graveyards and Parks. The Rs. 8050.00 per Acre will be charged as supervision charges before obtaining NOC. The 100% infrastructure cost/charges will be paid before getting NOC from WASA and connection with WASA system will be made afterwards.
- d. If any factory owner/unit wants to lay water supply lines and sewers/drainage system on self help basis to connect with private colony/factory system, the applicant/factory/unit will pay Rs. 828.00 per Marla as infrastructure cost/charges for sewer line/drainage and Rs. 805.00 per Marla for water supply and 8050.00 per Acre as supervision charges to WASA. These charges will be paid before obtaining NOC.
- e. EDO (Revenue) will identify the owner.
- f. If any Govt: department i.e UD Wing (FDA), HUD & PHE Department, Labour Department and any other develops any colony / unit / institution, these Departments will pay Rs. 805.00 per Marla for water supply, Rs. 828.00 per Marla for Sewer/ Drainage (on saleable / useable area) as infrastructure charges to WASA before connection with WASA system.
- g. Those private colonies, who have already obtained the NOC from FDA-UD Wing, will develop its water supply/sewer/drainage system through WASA. The owners and residents of these private colonies will deposit Rs. 8050.00 per acre as supervision fee and RS. 828.00 per Marla (on saleable area) to WASA for water supply, sewer/drainage system.

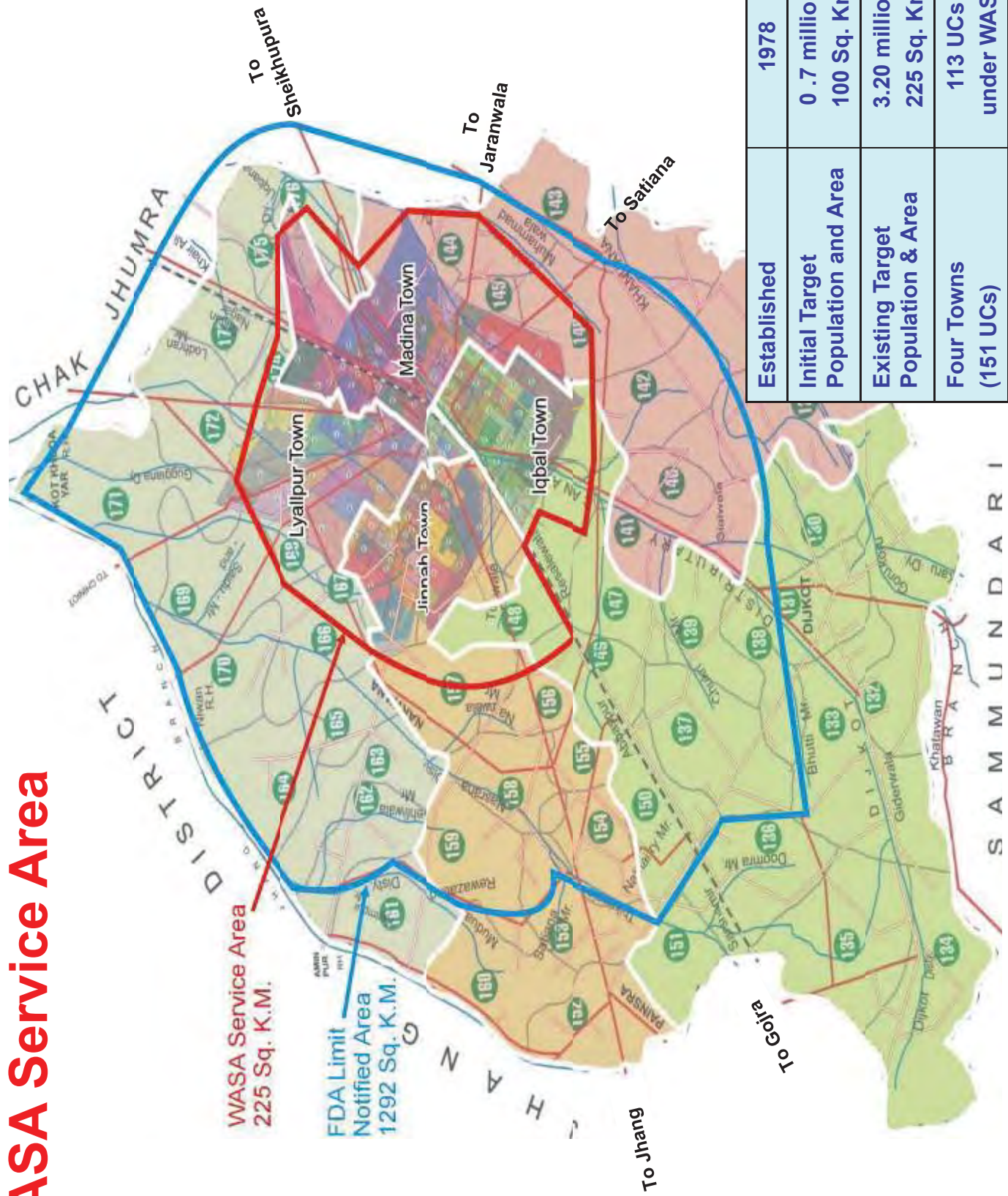
- h. Those private colonies who have already connected with WASA system, the residents of these colonies will pay 1288.00 per connection (in installment with routine bill of WASA) separately for water supply, sewer/drainage.
- 10. The Abadies developed by FAUP/PMU and other private colonies, where the water supply, sewer/drainage system have provided as per WASA standard on self help basis, the consumers of these Abadies will pay 50% of the security, connection fee, Regularization fee. The service charges will be charged at full rate/tariff.
- 11. The rates of water supply and sewerage /drainage in tariff will be increased according to the increase in salaries, POL, Electricity, other services charges, taxes and increase in prices of other commodities etc.
- 12. In case bill/demand note is paid after due date, 10% surcharges will be charged.

**For and on Behalf of
Faisalabad Development Authority**

**MANAGING DIRECTOR,
WATER AND SANITATION AGENCY,
FDA, FAISALABAD.**

WASA Service Area

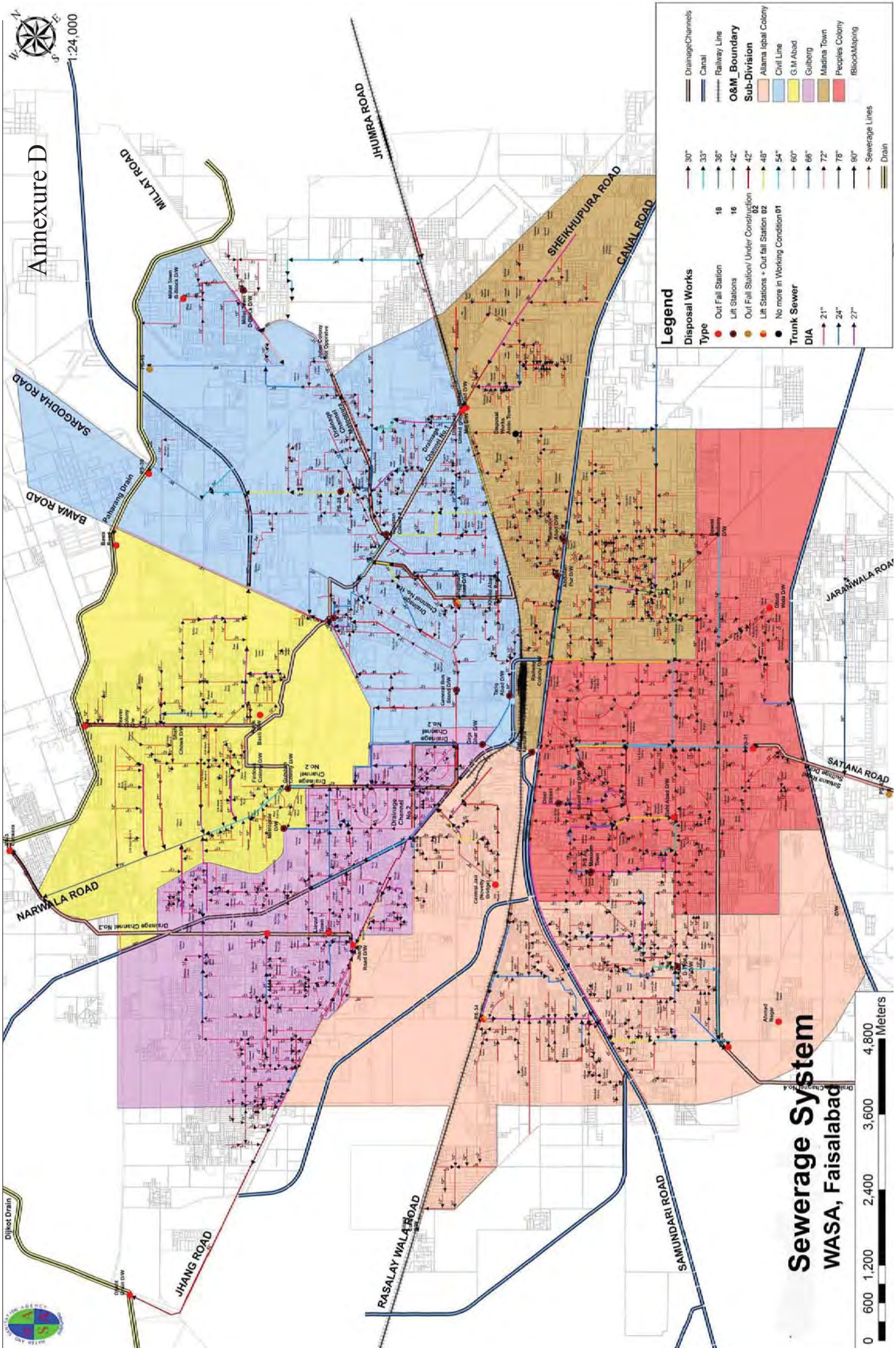
ANNEX - "□"



| Established | 1978 |
|------------------------------------|----------------------------|
| Initial Target Population and Area | 0.7 million 100 Sq. Km |
| Existing Target Population & Area | 3.20 million 225 Sq. Km |
| Four Towns (151 UCs) | 113 UCs under WASA |



Annexure D



Legend

Disposal Works

Type

●

 Out Fall Station

●

 Lift Stations

●

 Out Fall Station/ Under Construction

●

 Lift Stations + Out Fall Station 02

●

 No more in Working Condition 01

●

 Trunk Sewer

—

 DIA

—

 21"

—

 24"

—

 27"

→

 30"

→

 33"

→

 36"

→

 42"

→

 48"

→

 54"

→

 60"

→

 66"

→

 72"

→

 78"

→

 90"

→

 Sewerage Lines

→

 Drain

—

 Drainage Channels

—

 Canal

—

 Railway Line

—

 O&M Boundary

—

 Sub-Division

—

 Allama Iqbal Colony

—

 Civil Line

—

 G.M. Abad

—

 Gulberg

—

 Madina Town

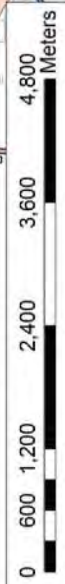
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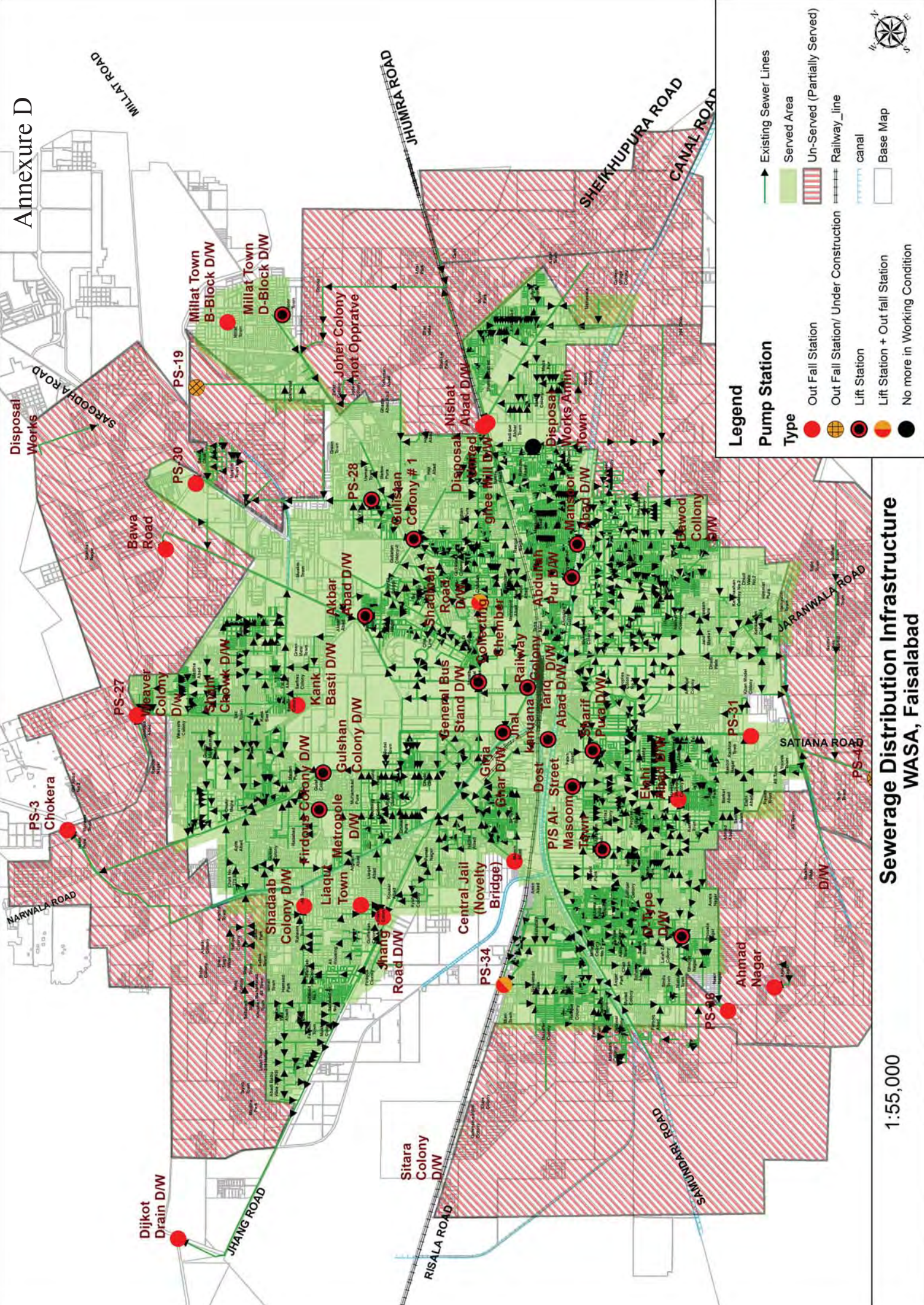
 Peoples Colony

—

 Block Mapping

Sewerage System WASA, Faisalabad

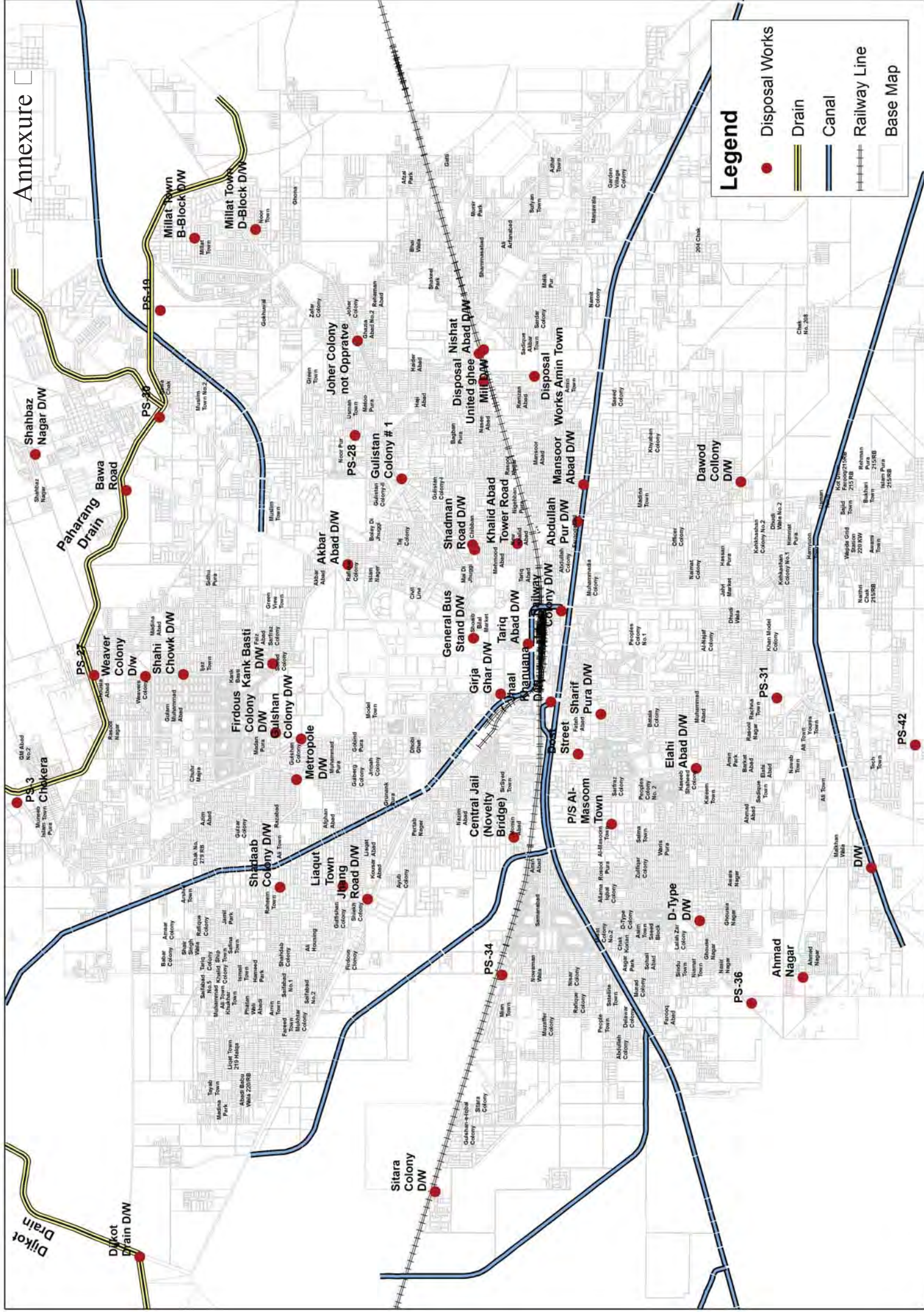




**Sewerage Distribution Infrastructure
WASA, Faisalabad**

1:55,000

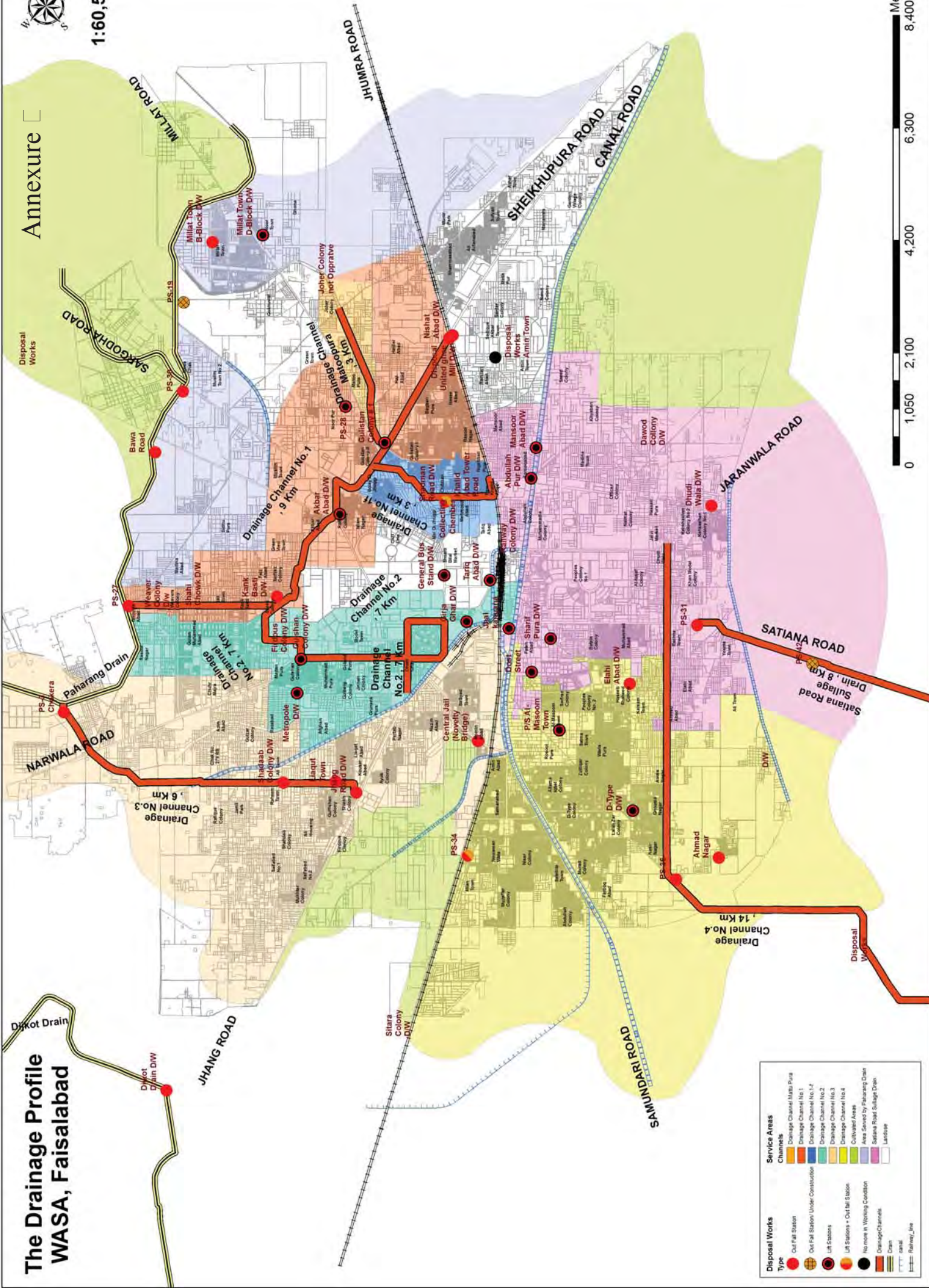
Annexure



The Drainage Profile WASA, Faisalabad

Annexure

1:60,500



- Disposal Works**
- Type
 - Outfall Station
 - Outfall Station Under Construction
 - Lift Station
 - Lift Station + Outfall Station
 - No more in Working Condition
 - Drainage Channels
 - Drain
 - canal
 - Railway Line
- Service Areas**
- Drainage Channel Main Pura
 - Drainage Channel No. 1
 - Drainage Channel No. 2
 - Drainage Channel No. 3
 - Drainage Channel No. 4
 - Drainage Channel No. 5
 - Drainage Channel No. 6
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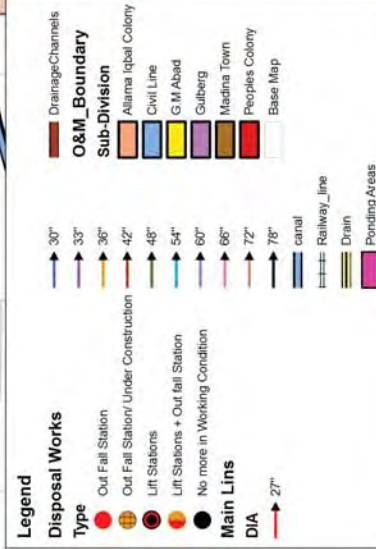
0 1,050 2,100 4,200 6,300 8,400 Meters



O&M Sub-Division Boundaries & Ponding Areas

WASA, Faisalabad

1:50,000



PONDING AREAS

CIVIL LINE SUB-DIVISION

| Sr. No. | PROBLEM POINT |
|---------|---------------------------------------|
| 1 | 66' Bazar Nishat Abad Sheikhpura Road |
| 2 | Ghaziabad No.2 |
| 3 | Sheikhpura Road Jamilabad chowk |
| 4. | Gardan Mohalla |
| 5. | Millat Chowk Sheikhpur Road. |

GULBERG SUB DIVISION

| | |
|----|--------------------------------------|
| 6. | Khokhar Town Sohail Basti Jamil Park |
| 7. | Bilal Park, Saifabad No.2 |
| 8. | Eid gha chowk Jhang Road |

GHULAM MUHAMMAD ABAD

| | |
|-----|------------------------|
| 9 | General Hospital G.M.A |
| 10. | Sialvi Road |

A LLAMA IQBAL COLONY SUB DIVISION

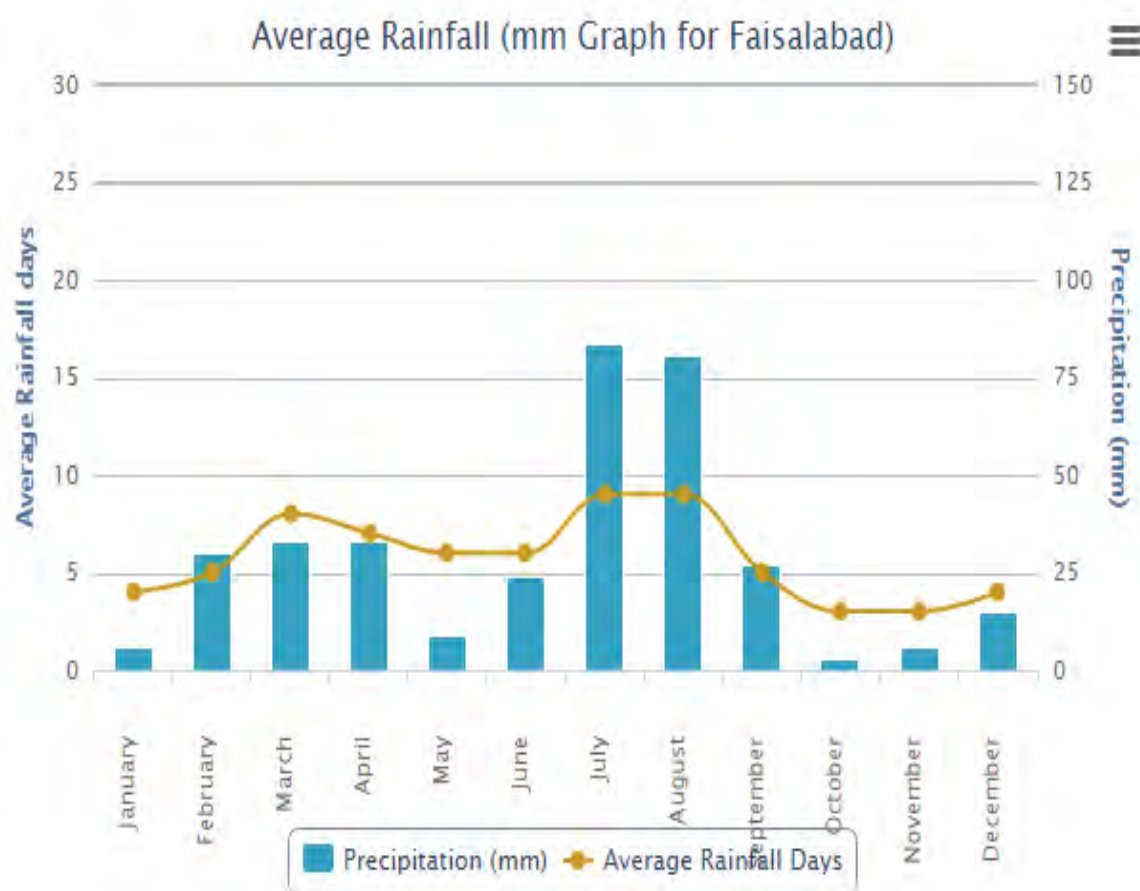
| | |
|-----|------------------------------------|
| 11. | Main road Allama Iqbal Colony |
| 12 | Sammundri Road near Novelty Bridge |
| 13 | Chaudhry Flour Mills Chowk |
| 14 | Dijkot road |

PEOPLES COLONY SUB DIVISION

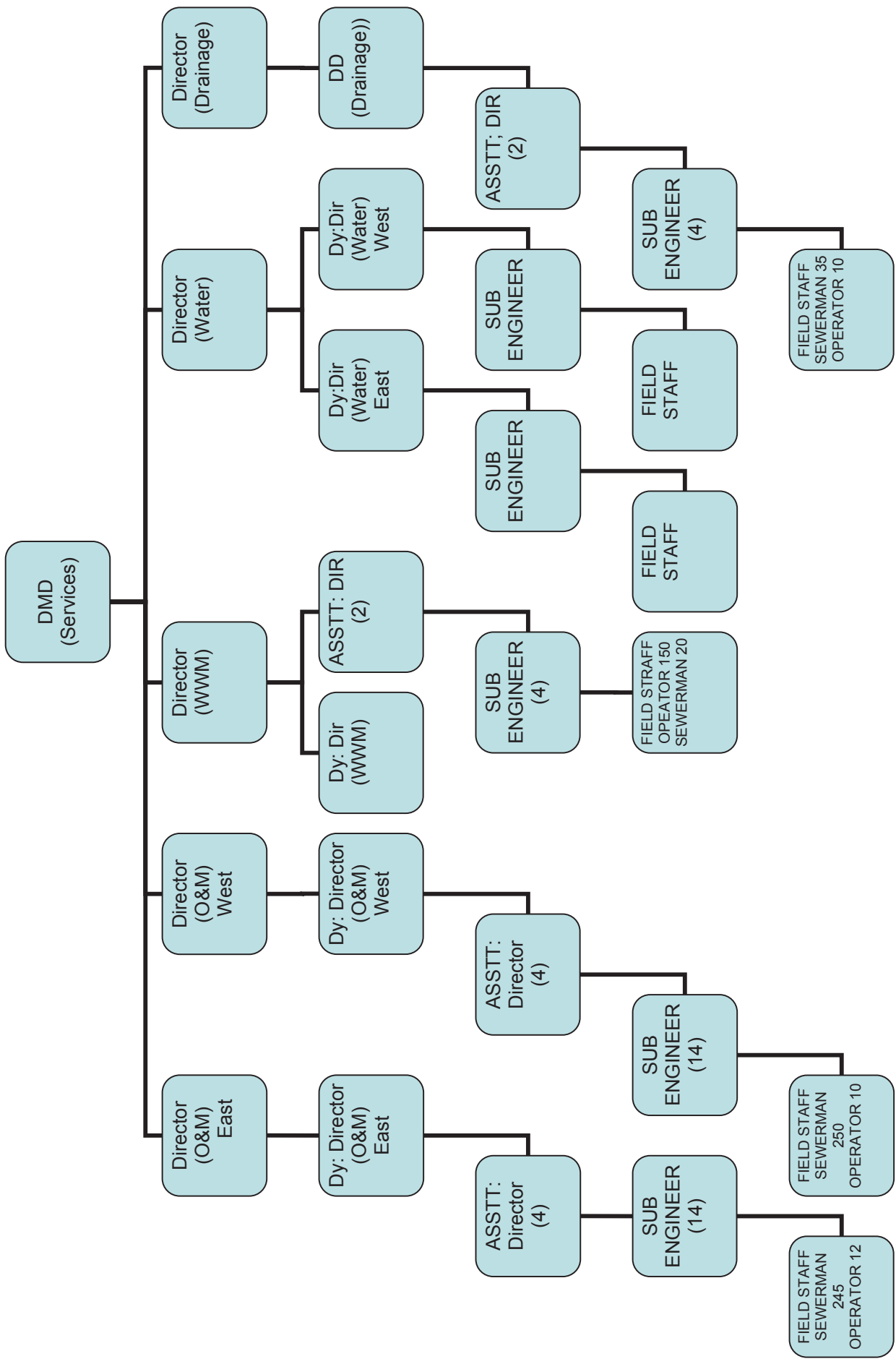
| | |
|-----|--|
| 15. | Main Summandri road near LCM School |
| 16. | Block C peoples colony No.2 |
| 17. | Al-Masoom Town near Blessing home school |
| 18. | Saad Bela Peoplec Colony No.1 |

MADINA TOWN SUB DIVISION

| | |
|----|---|
| 20 | Overhead bridge Nishatabad |
| 21 | Under Abdullapur Bridge crossing |
| 22 | Govt. Girls College Road |
| 23 | Main Susan road |
| 24 | Jhumra road in front of railway station |



ANNEX-“J”



WATER & SANITATION AGENCY (FDA) FAISALABAD

SUMMARY OF ANNUAL BUDGET

| Serial | Description | Approved 2009-10 | Revised 2009-10 | Budget 2010-11 | Detail at Page No |
|--------|--|------------------|-----------------|-----------------|-------------------|
| A | RECEIPT | | | | |
| 1 | DEVELOPMENT | 1997.216 | 1317.147 | 3366.328 | 6 |
| 2 | NON DEVELOPMENT | 845.720 | 687.085 | 990.590 | 15 |
| | TOTAL:- | 2842.936 | 2004.232 | 4356.918 | |
| B | EXPENDITURE | | | | |
| 1 | DEVELOPMENT | 1997.216 | 1192.200 | 3366.328 | 6 |
| 2 | NON DEVELOPMENT | 845.480 | 675.595 | 990.130 | 16 |
| | TOTAL:- | 2842.696 | 1867.795 | 4356.458 | |
| C | DEVELOPMENT Surplus | 0.000 | 124.947 | 0.000 | |
| D | DEVELOPMENT Fund Lapsed | 0.000 | 101.010 | 0.000 | 6 |
| E | Net Development (Surplus/Deficit) (C-D) | 0.000 | 23.937 | 0.000 | |
| F | NON DEVELOPMENT Surplus/(Deficit) | 0.240 | 11.490 | 0.460 | 16 |
| G | Over all Annual Budget Surplus / (Deficit) | 0.240 | 35.427 | 0.460 | |

(Rs. in million)

WATER & SANITATION AGENCY (FDA) FAISALABAD

SUMMARY OF ANNUAL BUDGET

| (Rs. in million) | | | | | |
|------------------|-----------------------------------|----------------|------------------------|----------------|-------------------|
| Serial | Description | Budget 2010-11 | Revised Budget 2010-11 | Budget 2011-12 | Detail at Page No |
| A | RECEIPTS | | | | |
| 1 | DEVELOPMENT | 3366.328 | 2954.858 | 4301.934 | 7 |
| 2 | NON DEVELOPMENT | 990.590 | 751.749 | 984.628 | 16 |
| | TOTAL:- | 4356.918 | 3706.607 | 5286.562 | |
| B | EXPENDITURES | | | | |
| 1 | DEVELOPMENT | 3366.328 | 2915.745 | 4301.934 | 7 |
| 2 | NON DEVELOPMENT | 990.130 | 855.241 | 1219.110 | 17 |
| | TOTAL:- | 4356.458 | 3770.986 | 5521.044 | |
| | DEVELOPMENT Surplus | (0.000) | 39.113 | 0.000 | |
| | NON DEVELOPMENT Surplus/(Deficit) | 0.460 | (103.492) | (234.482) | * 17 |

* Non -Development Deficit for the Year 2010-11

103.492 million

Non-Development Deficit for the Year 2011-12

130.990 million

TOTAL DEFICIT

234.482 million

BUDGET AT A GLANCE

OVER ALL

(Rs. in Million)

| ial | Description | Budget 2011-12 | Revised Budget 2011-12 | Budget 2012-13 | Detail at Page No |
|-----|-------------------|-------------------|------------------------------|-------------------|----------------------|
| | | | | | |
| | RECEIPTS: | | | | |
| | NON DEVELOPMENT | 864.628 | 833.394 | 1212.455 | 10 |
| | DEVELOPMENT | 4178.434 | 4606.016 | 2172.965 | 19 |
| | Total | 5043.062 | 5439.410 | 3385.420 | |
| | | | | | |
| | EXPENDITURE: | | | | |
| | NON DEVELOPMENT | 1219.110 | 908.853 | 1594.955 | 11 |
| | DEVELOPMENT | 4178.434 | 4562.810 | 2172.965 | 19 |
| | Total | 5397.544 | 5471.663 | 3767.920 | |
| | | | | | |
| | SURPLUS/(DEFICIT) | | | | |
| | NON DEVELOPMENT | (354.482) | (75.459) | (382.500) | |
| | DEVELOPMENT | 0.000 | 43.206 | 0.000 | |
| | OVERALL | (354.482) | (32.253) | (382.500) | |

BUDGET AT A GLANCE
OVER ALL

(Rs. in Million)

| Sr. No | Description | Budget 2012-13 | Revised Budget 2012-13 | Budget 2013-14 | Detail at Page No |
|--------|-------------------|-------------------|------------------------------|-------------------|-------------------------|
| A | RECEIPTS: | | | | |
| 1 | NON DEVELOPMENT | 1212.455 | 1152.376 | 1820.120 | 10 |
| 2 | DEVELOPMENT | 672.965 | 852.917 | 1413.042 | 19 |
| | Total | 1885.420 | 2005.293 | 3233.162 | |
| B | EXPENDITURE: | | | | |
| 1 | NON DEVELOPMENT | 1594.955 | 1291.186 | 1820.120 | 11 |
| 2 | DEVELOPMENT | 672.965 | 682.197 | 1413.042 | 19 |
| | Total | 2267.920 | 1973.383 | 3233.162 | |
| C | SURPLUS/(DEFICIT) | | | | |
| 1 | NON DEVELOPMENT | (382.500) | (138.810) | 0.000 | |
| 2 | DEVELOPMENT | 0.000 | 170.720 | 0.000 | |
| | OVERALL | (382.500) | 31.910 | 0.000 | |

BUDGET AT A GLANCE

(Rs. in Million)

| Sr. No | Description | Budget 2013-14 | Revised Budget 2013-14 | Budget 2014-15 | Detail at Page No |
|----------|--------------------------|-------------------|------------------------------|-------------------|----------------------|
| A | RECEIPTS: | | | | |
| 1 | NON DEVELOPMENT | 1820.120 | 1358.846 | 1775.476 | 7 |
| 2 | DEVELOPMENT | 1413.042 | 2073.845 | 2322.667 | 18 |
| | Total | 3233.162 | 3432.691 | 4098.143 | |
| B | EXPENDITURE: | | | | |
| 1 | NON DEVELOPMENT | 1820.120 | 1384.902 | 1773.510 | 8 |
| 2 | DEVELOPMENT | 1413.042 | 1826.006 | 2322.667 | 18 |
| | Total | 3233.162 | 3210.908 | 4096.177 | |
| C | SURPLUS/(DEFICIT) | | | | |
| 1 | NON DEVELOPMENT | 0.000 | (26.056) | 1.966 | |
| 2 | DEVELOPMENT | 0.000 | 247.839 | 0.000 | |
| | OVERALL | 0.000 | 221.783 | 1.966 | |

ANNEX-“M”

| S. No. | Equipment | Model | Year | Manufacturer/ Country | Running hours/ Per year | Working condition | Maintenance method | Location |
|--------|--------------------------------------|-------|------|--------------------------|-------------------------------|------------------------------|-----------------------|--------------------------|
| 1 | Jetter machine FDJ-15 | 2014 | 2014 | Mitsubishi Japan | 2400 hours per years | Good working condition | Need basis | Millat Town |
| 2 | Jetter machine FDJ-16 | 2014 | 2014 | Mitsubishi Japan | 2200 hours per years | Good working condition | Need basis | Gulshan colony D/W |
| 3 | Jetter machine FDJ-17 | 2014 | 2014 | Mitsubishi Japan | 2500 hours per years | Good working condition | Need basis | OHR C.Lines |
| 4 | Jetter machine FDJ-18 | 2014 | 2014 | Mitsubishi Japan | 2340 hours per years | Good working condition | Need basis | Parking yard |
| 5 | Jetter machine FDJ-19 | 2014 | 2014 | Mitsubishi Japan | 2440 hours per years | Good working condition | Need basis | AIC OHR |
| 6 | Jetter machine FDJ-20 | 2014 | 2014 | Mitsubishi Japan | 2500 hours per years | Good working condition | Need basis | Parking yard |
| 7 | Jetter machine FDJ-21 | 2014 | 2014 | Mitsubishi Japan | 2300 hours per years | Good working condition | Need basis | Madina Town |
| 8 | Jetter machine FDJ-22 | 2014 | 2014 | Mitsubishi Japan | 2200 hours per years | Good working condition | Need basis | OHR PC |
| 9 | Jetter machine PK-211 | 2002 | 2002 | Nissan Japan | 2500 hours per years | Good working condition | Need basis | OHR PC-I |
| 10 | Sludge sucker 081085 | 2008 | 2008 | Japan | 500 hours per years | Good working condition | Need basis | OHR C.Line |
| 11 | Sludge sucker | 2002 | 2002 | Japan | 450 hours per years | Good working condition | Need basis | OHR PC-I |
| 12 | Sucker machine FDJ-23 | 2014 | 2014 | Mitsubishi Japan | 1200 hours per years | Good working condition | Need basis | Parking yard |
| 13 | Sucker machine FDJ-24 | 2014 | 2014 | Mitsubishi Japan | 1400 hours per years | Good working condition | Need basis | Parking yard |
| 14 | Excavator FDJ-49 | 2013 | 2013 | JCB England | 2500 hours per years | Good working condition | Need basis | Parking yard |
| 15 | Excavator FDJ-50 | 2013 | 2013 | JCB England | 2400 hours per years | Good working condition | Need basis | Parking yard |
| 16 | Truck mounted crane FDJ33 | 2014 | 2014 | Mitsubishi Japan | 1200 hours per years | Good working condition | Need basis | Parking yard |
| 17 | Truck mounted crane FDJ- 34 | 2014 | 2014 | Mitsubishi Japan | 1300 hours per years | Good working condition | Need basis | Parking yard |
| 18 | Dumper FDJ-25 | 2014 | 2014 | Mitsubishi Japan | 2700 hours per years | Good working condition | Need basis | Parking yard |

ANNEX-M

| | | | | | | | | |
|----|------------------------|------|------|---------------------|----------------------------|------------------------------|------------|-----------------|
| 19 | Dumper FDJ-26 | 2014 | 2014 | Mitsubishi Japan | 2500 hours per years | Good working condition | Need basis | Parking yard |
| 20 | Dumper FDJ-27 | 2014 | 2014 | Mitsubishi Japan | 2800 hours per years | Good working condition | Need basis | Parking yard |
| 21 | Dumper FDJ-28 | 2014 | 2014 | Mitsubishi Japan | 2400 hours per years | Good working condition | Need basis | Parking yard |
| 22 | Dumper FDJ-29 | 2014 | 2014 | Mitsubishi Japan | 2700 hours per years | Good working condition | Need basis | Parking yard |
| 23 | Dumper FDJ-30 | 2014 | 2014 | Mitsubishi Japan | 2600 hours per years | Good working condition | Need basis | Parking yard |
| 24 | Dumper FDJ-32 | 2014 | 2014 | Mitsubishi Japan | 2900 hours per years | Good working condition | Need basis | Parking yard |
| 25 | Mini backhoe | 2014 | 2014 | JCB England | 400 hours per years | Good working condition | Need basis | Parking yard |
| 26 | Mini backhoe | 2014 | 2014 | JCB England | 500 hours per years | Good working condition | Need basis | Parking yard |
| 27 | Mini truck Shehzoor | 2007 | 2007 | Hyundai | 1500 hours per years | Good working condition | Need basis | Parking yard |
| 28 | Mazda tuck FDN-6428 | 1990 | 1990 | MAZDA | 1200 hours per years | Good working condition | Need basis | Parking yard |
| 29 | Sewer jetter | 1986 | 1986 | England | 2400 hours per years | Good working condition | Need basis | OHR GC |
| 30 | Water Bouzer | 2010 | 2010 | Isuzu Japan | 3100 hours per year | Good working condition | Need basis | OHR GC |
| 31 | Water Bouzer | 2010 | 2010 | Isuzu Japan | 3400 hours per year | Good working condition | Need basis | OHR GC |
| 32 | Water Bouzer | 2010 | 2010 | Isuzu Japan | 3200 hours per year | Good working condition | Need basis | OHR GC |

ANNEX-"N"

Detail regarding Disposal Stations in WASA, Faisalabad

| No. | Name of Lift Station | Established Year | Pump Type | Number and Capacity of Pumps | | | Motor Power (kw) | Operation hour (hr/day) | Total Capacity | | Status of Pump | Final Discharge Point |
|-----|------------------------|------------------|-----------|------------------------------|-------|--------|------------------|-------------------------|----------------|--------------|----------------|-----------------------|
| | | | | (Nos) | (Cfs) | (m³/s) | | | Nos x (Cfs) | Nos x (m³/s) | | |
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| No. | Name of Lift Station | Established Year | Pump Type | Number and Capacity of Pumps | | | Motor Power (kw) | Operation hour (hr/day) | Total Capacity | | Status of Pump | Final Discharge Point |
|-----|------------------------|------------------|-----------|------------------------------|-------|---------------------|------------------|-------------------------|----------------|---------------------------|----------------|-----------------------|
| | | | | (Nos) | (Cfs) | (m ³ /s) | | | Nos x (Cfs) | Nos x (m ³ /s) | | |
| 01 | 0000000000n | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 00 | 00000 | 00 | 0000r0n0Dr0n |
| 02 | 000n000000 | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 00 | 00000 | 00 | 0000r0n0Dr0n |
| | | | 0 | 0 | 0 | 00000 | 00 | 00 | | | | |
| 03 | 000r00ure0 00000 | 00000 | 0 | 0 | 00 | 00000 | 00 | 00 | 00 | 00000 | 00 | 0000r0n0Dr0n |
| | | | 0 | 0 | 0 | 00000 | 00 | 00 | | | | |
| | | | 0 | 0 | 0 | 00000 | 00 | 00 | | | | |
| 04 | 0u0000n0000n0 00000 | 00000 | 0 | 0 | 00 | 00000 | 00 | 00 | 00 | 00000 | 00 | 0000r0n0Dr0n |
| | | | 0 | 0 | 0 | 00000 | 00 | 00 | | | | |
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| 05 | 000000000er0 | 0000 | 0 | 0 | 00 | 00000 | 000 | 00 | 000 | 00000 | 00 | 0000r0n0Dr0n |
| | | | 0 | 0 | 00 | 00000 | 000 | 00 | | | | |
| 06 | 0e00er0000n0 | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 0 | 00000 | 00 | 0000r0n0Dr0n |
| 07 | 000000000n | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 0 | 00000 | 00 | 0000r0n0Dr0n |
| | | | 0 | 0 | 0 | 00000 | 00 | 00 | | | | |
| 08 | 0e0000e0 | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 00 | 00000 | 00 | 0000r0n0Dr0n |
| 09 | 0u0000n0000n0 | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 0 | 00000 | 00 | 0000r0n0Dr0n |
| 10 | 0r0000r | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 0 | 00000 | 00 | 0000r0n0Dr0n |
| 11 | A000r0000 | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 00 | 00000 | 00 | 0000r0n0Dr0n |
| | | | 0 | 0 | 0 | 00000 | 00 | 00 | | | | |
| 12 | 00en0000u0 | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 0 | 00000 | 00 | 0000r0n0Dr0n |
| 13 | 000000n | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 00 | 00000 | 00 | 0000r0n0Dr0n |
| | | | 0 | 0 | 0 | 00000 | 00 | 00 | | | | |
| 14 | 0r000000 | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 0 | 00000 | 00 | 0000r0n0Dr0n |
| 15 | 0000000000000 | 0000 | 0 | 0 | 00 | 00000 | 00 | 00 | 00 | 00000 | 00 | 0000r0n0Dr0n |
| 16 | 0u0000ne000000 | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 0 | 00000 | 00 | 0000r0n0Dr0n |
| 17 | A00000000 0000n | 00000 | 0 | 0 | 0 | 00000 | 00 | 00 | 0 | 00000 | 00 | 0000r0n0Dr0n |
| 18 | A0r0000r0 | 0000 | 0 | 0 | 0 | 00000 | 00 | 0 | 0 | 00000 | 00 | A0r0D0000u0r0 |
| 19 | D0000Dr0n | 0000 | 0 | 0 | 0 | 00000 | 00 | 00 | 00 | 00000 | 00 | 0000r0n0Dr0n |
| | | | 0 | 0 | 0 | 00000 | 00 | 00 | | | | |

Annexure

| BPS | WWM | WATER | REVENUE | P&D | O&M | O&M | MD OFFICE | I&C | FF | DMD S | DMD F&R | DMD ENGG | CHANGA | FINANCE | DRAINAGE | CONST-I | CONST-II | ADMIN |
|-----|-----|-------|---------|-----|-----|-----|-----------|-----|----|-------|---------|----------|--------|---------|----------|---------|----------|-------|
| 1 | 37 | 16 | 62 | 7 | 122 | 166 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 10 | 2 | 1 | 23 |
| 2 | 57 | 136 | 37 | 4 | 34 | 98 | 1 | 0 | 0 | 3 | 0 | 1 | 0 | 2 | 7 | 0 | 2 | 4 |
| 3 | 48 | 120 | 21 | 5 | 72 | 30 | 1 | 0 | 0 | 1 | 1 | 3 | 0 | 4 | 4 | 1 | 2 | 7 |
| 4 | 24 | 34 | 9 | 2 | 8 | 41 | 2 | 1 | 0 | 1 | 0 | 4 | 0 | 1 | 1 | 5 | 1 | 14 |
| 5 | 9 | 8 | 14 | 6 | 42 | 11 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 7 |
| 6 | 10 | 1 | 2 | 1 | 3 | 7 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 4 |
| 7 | 3 | 6 | 25 | 4 | 2 | 6 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 1 | 1 | 1 | 12 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9 | 0 | 0 | 5 | 1 | 5 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 5 |
| 10 | 0 | 0 | 9 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| 11 | 6 | 4 | 7 | 5 | 12 | 7 | 3 | 3 | 11 | 0 | 0 | 0 | 0 | 13 | 2 | 3 | 8 | 2 |
| 12 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 12 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 |
| 14 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 |
| 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 1 | 1 | 7 | 4 | 7 | 5 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 5 | 0 | 5 | 1 | 8 |
| 17 | 12 | 5 | 8 | 6 | 6 | 5 | 1 | 6 | 6 | 0 | 0 | 0 | 3 | 4 | 0 | 3 | 4 | 8 |
| 18 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| 19 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

MODULE PROJECT-13

(Professional Training of WASA Staff)

| Sr. No. | Subject |
|---------|--|
| 1 | Risk Management Training |
| 2 | Water Quality Assurance at House hold Level |
| 3 | Gender & Development |
| 4 | Office Management |
| 5 | Non Revenue Water |
| 6 | Use of CAD tools |
| 7 | Design of Sewerage Schemes |
| 8 | Occupational Health an Safety for Engineers |
| 9 | Time Management |
| 10 | Stress Management |
| 11 | Financial Management |
| 12 | Commercial Budget Management (1 Week) |
| 13 | Design of Water Supply Schemes (1 Week) |
| 14 | Project Cycle Management |
| 15 | Workshop on occupational health and safety |
| 16 | Progress to Review of DLIs & EEPs of PCGIP |
| 17 | Effective communication and presentation skills |
| 18 | PC-I-V / Monitoring & Evaluation Techniques / Development of KPIs. |
| 19 | CPD short course series on "Risk Assessment and Management" |
| 20 | Project preparation and management in PPMI Islamabad |
| 21 | Monitoring and Evaluation / RBM (Some tools techniques and approaches" |
| 22 | Preparation and evaluation |
| 23 | Energy Conservation |
| 24 | Presentation Skills |
| 25 | Contract Management |
| 26 | Water Treatment |
| 27 | Introduction to GIS related Software & Equipment (2 Days) |
| 28 | Waste Water Treatment |

WASA
GUJRANWALA

Questionnaire on the Water Supply Business

Questionnaire 1: Information of WASA in Punjab Province

1. City information 都市の情報

1-1. Name of water supply organization that performs water supply service 水道事業者名称

Water and sanitation agency Gujranwala

1-2. Name of city that performs water supply service 水道事業を行う都市の名称

Gujranwala

1-3. Population of water service area (person) 給水都市の人口(人)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| 206496 | 207000 | 207744 | 208728 |

1-4. City area (km²) 都市の面積(km²)

| Total area | Water supply area |
|-------------------|---------------------|
| 63km ² | 25.2km ² |

1-5. Number of service connection (number of water meter) 給水(契約)戸数(戸、水道メータ数)

| 2011 | 2012 | 2013 | 2014 |
|-------|-------|-------|-------|
| 25812 | 25875 | 25968 | 26091 |

1-6. Population served by water supply as percentage of total population (%) 水道普及率(%)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|-------|
| 11.47% | 11.50% | 11.54% | 11.6% |

2. Water resource / Water treatment 水源／浄水

2-1. Water resource (m³/day) 水源(m³/日)

| Surface (River / Dam) | Groundwater | Seawater | Other |
|-------------------------|--------------------------|-------------------------|-------------------------|
| N/D m ³ /day | 95731m ³ /day | N/D m ³ /day | N/D m ³ /day |

2-2. Method of water intaken 取水方式

Deep well water pumping

2-3. Number and capacity of Water Treatment Plant (WTP) (number, m³) 浄水場数と処理能力(箇所、m³)

| Number of WTP | Total capacity (m ³ /day) |
|---------------|--------------------------------------|
| Nil | m ³ /day |

| No. | WTP Name | Built year | Capacity | Treatment volume (average) |
|-----|----------|------------|---------------------|----------------------------|
| | N/D | | m ³ /day | m ³ /day |
| | N/D | | m ³ /day | m ³ /day |
| | N/D | | m ³ /day | m ³ /day |

2-4. Name and dosing rate of coagulant (mg/L) 凝集剤名称および注入率(mg/L)

| Name of coagulant | Dosing rate of coagulant (mg/L) |
|-------------------|---------------------------------|
| N/D | mg/L |

2-5. Type of sedimentation and filtration 沈殿・ろ過の種類

| | |
|-----------------------|-----|
| Type of sedimentation | N/D |
| Type of filtration | N/D |

2-6. Filtration speed rate (m/day) ろ過速度(m/day)

| Slow sand filter | Rapid sand filter |
|------------------|-------------------|
| Nil m/day | Nil m/day |

2-7. Name and dosing rate of disinfection (mg/L) 消毒剤名称および注入率(mg/L)

| Name of disinfection | Dosing rate of disinfection (mg/L) |
|----------------------|------------------------------------|
| chlorination | 0.2-0.5ppm mg/L |
| | mg/L |

2-8. Number and capacity of distribution reservoir (number, m³) 配水池数と容量(箇所、m³)

| Number | Total capacity (m) | Minimum reservoir (m ³) | Maximum reservoir (m ³) |
|--------|--------------------|-------------------------------------|-------------------------------------|
| 10 | 7200m ³ | 225m ³ | 1350m ³ |

2-9. Production cost of water treatment (PHP/m³) 造水コスト(PHP/m³)

| | |
|------------------------|------------------------|
| N/D PHP/m ³ | N/D USD/m ³ |
|------------------------|------------------------|

2-10. Number of items of water quality inspection (number) 水質検査項目数(数)

| Everyday | Every week | Every month | Every year |
|----------|------------|-------------|------------|
| N/D | N/D | N/D | N/D |

2-11. Hour of water suspension and supply turbidity water (times, hour/year) 断水・濁水時間(時間/年)

| | Number of times | Total hours |
|------------------------|-----------------|-------------|
| Water suspension | N/D | N/D |
| Supply turbidity water | N/D | N/D |

2-12. Describe the problem about water treatment 浄水処理の問題点の記述

| |
|-----|
| N/A |
|-----|

3. Organization 組織体制

3-1. Total number of KCWN staff member (person) 職員数(人)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 469 | 473 | 571 | 627 |

3-2. Total number of engineer staff member (person) 技術職員数(人)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 22 | 22 | 22 | 21 |

3-3. Proportion of staff member according to staff's age (%) 職員年齢構成(%)

| 10's – 20's | 30's | 40's | 50's – |
|-------------|------|------|--------|
| 24% | 28% | 24% | 24% |

3-4. Proportion of staff member's business experience of water supply (%) 職員経験年数構成 (%)

| – 5 years | 5 – 10 years | 10 – 20 years | 20 – 30 years | 30 years – |
|-----------|--------------|---------------|---------------|------------|
| 24% | 0% | 29% | 33% | 14% |

3-5. Hour of staff's training (times/person, hour/year/person) 職員研修時間(回/人、時間/人)

| | Inner training (exclude OJT) | | Outsourcing | |
|------------------|------------------------------|-------------------|--------------|-------------------|
| | Times/person | Total hour/person | Times/person | Total hour/person |
| Engineer | N/D | N/D | N/D | N/D |
| Exclude engineer | N/D | N/D | N/D | N/D |

4. Water tariff 水道料金

4-1. Price and consumption of domestic and commercial use (PHP, m³, average per month)

家事・業務用水道料金・使用水量(PHP/m³: 平均額)

| | Price | Average Consumption |
|----------------|------------------------|------------------------------|
| Domestic use | N/D PHP/m ³ | 2700175m ³ /month |
| Commercial use | N/D PHP/m ³ | 172351m ³ /month |

4-2. Collection frequency (month) 水道料金徴収間隔(月)

| |
|--------|
| 2Month |
|--------|

4-3. Collection rate of water charge (%) 水道料金徴収率(%)

| Domestic use | Commercial use |
|--------------|----------------|
| 41% | 39% |

4-4. Describe/Attach the water tariff table 水道料金表の記載

Attached Annex-A

Remarks:

Money exchange rate: 1 US Dollar (USD) = 104.5 Pakistani rupee (PKR) on April 2015

If no data, answer is "N/D", else if no answer or non-applicable, answer is "N/A".

Questionnaire on the Water Supply Business

Questionnaire 2: Leakage Prevention Work of WASA

1. Organization 組織

1-1. Name of organization for leakage prevention 漏水対策を担当する組織名称

WASA-G

1-2. Number of person in organization (person) 漏水対策を担当する組織の人員数(人)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/D | N/D | N/D | N/D |

1-3. Annual training time for leakage prevention (person, person x hours)

漏水対策に関する年間研修時間(人×時間)

| | 2013 | 2014 |
|----------------|------|------|
| Person | N/D | N/D |
| Person X Hours | N/D | N/D |

2. Leakage Detection 漏水調査

2-1. Number of leakage survey team (number) 調査チーム数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/D | N/D | N/D | N/D |

2-2. Number of person in one survey team (person) 1チーム当りの人数(人)

N/D

2-3. Number of days of leakage survey (person x days / year) 年間漏水調査日数(人×日／年)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/D | N/D | N/D | N/D |

2-4. Number of hours of average leakage survey (person x hours / month) 調査平均時間(人×時間／月)

N/D

2-5. Length of leakage survey (km / year) 年間漏水調査延長(km／年)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D km | N/D km | N/D km |

2-6. Number of surface leakage detection (number / year) 年間地上漏水発見数(箇所／年)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/D | N/D | N/D | N/D |

2-7. Number of underground leakage detection (number / year) 年間地下漏水発見数(箇所／年)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/D | N/D | N/D | N/D |

2-8. Breakdown of number of underground leakage detection by Acoustic rod, Leakage detector, Correlative leak detector, and other in 2011 (number)

地下漏水発見数の内訳：音聴棒、漏水探知機、相関式探知機、その他

| Acoustic rod | Leakage detector | Correlative leak detector | Other |
|--------------|------------------|---------------------------|-------|
| N/D | N/D | N/D | N/D |

2-9. Number of reparation of leakage site (number / year) 年間漏水箇所修理数(箇所)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/D | N/D | N/D | N/D |

2-10. Average time to repair from leakage detection and the longest hours (hour)

漏水発見から修理までに要する平均時間(時間)

| Average | Longest |
|----------|----------|
| N/D hour | N/D hour |

2-11. Number of leakage reports from public (number) 市民からの漏水の通報数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/D | N/D | N/D | N/D |

2-12. Have you done Minimum Night Flow Measure method? 夜間最小流量測定を行ったことがあるか？

| |
|-----|
| N/D |
|-----|

3. Equipment of Leakage Detection 漏水調査機材

3-1. Number of Acoustic rod/bar and Amplified acoustic rod (number)

単純アンプ内蔵型/アンプ内蔵型音聴棒の本数(数)

| Acoustic rod/bar | Amplified acoustic rod |
|------------------|------------------------|
| N/D | N/D |

3-2. Number of set of Correlative leak detector (number) 相関式漏水探知機のセット数(数)

| |
|-----|
| N/D |
|-----|

3-3. Number of set of Leak zone detector or Leak noise correlator (number)

音圧式漏水探知機のセット数(数)

| |
|-----|
| N/D |
|-----|

3-4. Number of sensor of Leak zone detector or Leak noise correlator (number)

音圧式漏水探知機のセンサー数(数)

N/D

3- Number of Metal pipe locator (number) 金属管探査機の台数(数)

N/D

3- Number of Resin pipe locator (number) 樹脂管探査機の台数(数)

N/D

3- Number of Distance measuring equipment (number) 距離測定装置の台数(数)

N/D

3- Number of Water meter measuring for MNFM (number) 夜間最小流量測定用水量メータの台数(数)

N/D

3- Number of vehicles used for leakage survey (number) 漏水対策に用いる車両台数(台)

N/D

3-10. Name of other leakage detector その他の漏水探知機

N/D

4. Water Distribution Analysis 配水量分析

Data in this table is 20___. 下表のデータは 20__ 年の水量。

| | | | | | |
|----------------------------|----------------------------------|---|---|--|-----|
| System Input Volume 配水量 | Authorized Consumption 認定使用水量 | Revenue Water 有収水量 | Billed Authorized Consumption 請求消費量 | Billed Metered Consumption (including water reported) 検針による料金徴収 | N/D |
| | | | | Billed Non-metered Consumption 検針に抛らない料金徴収 | N/D |
| | | Non-Revenue Water (N) () 無収水量 | Unbilled Authorized Consumption 非請求消費量 | Unbilled Metered Consumption 請求せず(検針あり・調停) | N/D |
| | | | | Unbilled Non-metered Consumption 請求せず(検針なし・事業用) | N/D |
| | Water Losses 損失水量 | | Apparent Losses 商業的(見かけ)損失量 | Unauthorized Consumption 不正規消費(盗水・不明水) | N/D |
| | | | | Metering Inaccuracies 水道メーター検針エラー | N/D |
| | | | Real Losses 実質損失量 | Leakage on Transmission and/or Distribution Mains 総配水管からの漏水 | N/D |
| | | | | Leakage and Overflows at Utilities Storage Tanks 貯水槽からの溢水、漏水 | N/D |
| | | Leakage on Service Connections up to Customers Meters 戸別メータまでの給水管からの漏水 | N/D | | |

4-11. Distributed Water (m³ / year) 年間総配水量(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/D m ³ | N/D m ³ | N/D m ³ | N/D m ³ |

4-12. Water tariff (Revenue Water) (m³ / year) 水道料金対象水量(有収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/D m ³ | N/D m ³ | N/D m ³ | N/D m ³ |

4-13. Other (Revenue Water) (m³ / year) その他の徴収料金対象水量(有収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/D m ³ | N/D m ³ | N/D m ³ | N/D m ³ |

4-14. Meter loss (Non-Revenue Water) (m³ / year) 水道メータ損失水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/D m ³ | N/D m ³ | N/D m ³ | N/D m ³ |

4-15. Stolen water (Non-Revenue Water) (m³ / year) 盗水損失水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/D m ³ | N/D m ³ | N/D m ³ | N/D m ³ |

4-16. Unpaid water (Non-Revenue Water) (m³ / year) 未納水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/D m ³ | N/D m ³ | N/D m ³ | N/D m ³ |

4-17. Leakage water (Non-Revenue Water) (m³ / year) 漏水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/D m ³ | N/D m ³ | N/D m ³ | N/D m ³ |

4-18. Waterworks usage volume (Non-Revenue Water) (m³ / year) 水道工事使用水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/D m ³ | N/D m ³ | N/D m ³ | N/D m ³ |

4-19. Unknown water (Non-Revenue Water) (m³ / year) 不明水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/D m ³ | N/D m ³ | N/D m ³ | N/D m ³ |

4-20. Other (Non-Revenue Water) (m³ / year) その他の無収水量(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/D m ³ | N/D m ³ | N/D m ³ | N/D m ³ |

5. DMA / Leakage Survey Scale DMA/漏水調査メッシュ

- 1. □ to make up meshes or blocks for leak detection. (□ make up meshes or blocks □ □MA is replaced with the meshes or blocks.)

漏水調査用のブロックやメッシュを構成しているか(構成している場合は、以下のDMAは読み替える)

| |
|-----|
| N/D |
|-----|

- 2. Number of □MA block (number) DMAブロック数(数)

| |
|-----|
| N/D |
|-----|

- 3. Number of connection in □MA (connection) □Average of all □MA / Minimum / Maximum□

DMA内給水戸数(戸)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/D | Minimum | N/D | Maximum | N/D |
|---------|-----|---------|-----|---------|-----|

- 4. Number of Hourly Factor in □MA □Average of all □MA / Minimum / Maximum□

DMA内時系数(ー)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/D | Minimum | N/D | Maximum | N/D |
|---------|-----|---------|-----|---------|-----|

- . □ ater supply average volume in □MA (m³ / day) □Average of all □MA / Minimum / Maximum□

DMA内日平均給水量(m³)[全ブロックの平均/最小/最大]

| | | | | | | | | |
|---------|-----|----------------|---------|-----|----------------|---------|-----|----------------|
| Average | N/D | m ³ | Minimum | N/D | m ³ | Maximum | N/D | m ³ |
|---------|-----|----------------|---------|-----|----------------|---------|-----|----------------|

- . □ ater supply maximum volume in □MA (m³ / day) □Average of all □MA / Minimum / Maximum□

DMA内日最大給水量(m³)[全ブロックの平均/最小/最大]

| | | | | | | | | |
|---------|-----|----------------|---------|-----|----------------|---------|-----|----------------|
| Average | N/D | m ³ | Minimum | N/D | m ³ | Maximum | N/D | m ³ |
|---------|-----|----------------|---------|-----|----------------|---------|-----|----------------|

- . □ ater pressure in □MA (MPa) □Average of all □MA / Minimum / Maximum□

DMA内給水圧(MPa)[全ブロックの平均/最小/最大]

| | | | | | | | | |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|
| Average | N/D | MPa | Minimum | N/D | MPa | Maximum | N/D | MPa |
|---------|-----|-----|---------|-----|-----|---------|-----|-----|

- . Number of valves formed □MA area (number) □Average of all □MA / Minimum / Maximum□

DMAを構成する(区切る)仕切弁数(数)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/D | Minimum | N/D | Maximum | N/D |
|---------|-----|---------|-----|---------|-----|

- . Number of valves in □MA (number) □Average of all □MA / Minimum / Maximum□

DMA内仕切弁数(数)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/D | Minimum | N/D | Maximum | N/D |
|---------|-----|---------|-----|---------|-----|

10. Number of hydrant in DMA (number) [Average of all DMA / Minimum / Maximum]

DMA内消火栓数(数)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/D | Minimum | N/D | Maximum | N/D |
|---------|-----|---------|-----|---------|-----|

11. Size of mesh (If make up meshes or blocks) (km²/km²)

漏水調査用メッシュがある場合、メッシュの大きさ(km×km)

| | | | |
|-----|-----------------|-----|-----------------|
| N/D | km ² | N/D | km ² |
|-----|-----------------|-----|-----------------|

12. Number of valve in distribution network (number) 総仕切弁数(数)

| |
|-----|
| N/D |
|-----|

13. Number of hydrant in distribution network (number) 総消火栓数(数)

| |
|-----|
| N/D |
|-----|

14. Number of another valve in distribution network (number) その他の調整弁等の総数(数)

| |
|-----|
| N/D |
|-----|

15. Number of water suspension (number / year) 年間断水回数(数/年)

| | |
|-----|---------------|
| N/D | number / year |
|-----|---------------|

16. The total number of connection of water suspension (connection / year) 年間断水のべ戸数(戸/年)

| | |
|-----|-------------------|
| N/D | connection / year |
|-----|-------------------|

17. Water suspension time per one time (hour / time) [Average / Maximum]

断水1回当たりの継続時間(時間/回)[平均/最大]

| | | | | | |
|---------|-----|-------------|---------|-----|-------------|
| Average | N/D | hour / time | Maximum | N/D | hour / time |
|---------|-----|-------------|---------|-----|-------------|

18. Describe the leakage repair flowchart 漏水修繕フロー図の記述

Complaint ----- A□□-----□□-----□L□M□□□

6. Distribution pipeline laying 管路布設

□-1. New installation pipeline length (km) 新規布設管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|---------|--------|--------|---------|
| 13.□□km | □.□□km | 3.3□km | 22.2□km |

□-2. Replacement pipeline length (km) 送配水管更新(入替)延長(km)

| 2011 | 2012 | 2013 | 2014 |
|---------|---------|--------|--------|
| 31.□1km | 13.22km | □.□2km | □1.□km |

□-3. Rehabilitation pipeline length (km) 更生管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D □m | N/D km | N/D km |

□-4. Removal pipeline length (km) 撤去管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D □m | N/D km | N/D km |

□-□. Suspended pipeline length (km) 休止管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D □m | N/D km | N/D km |

7. Distribution / Service Pipe material 送配給水管種別

□-1. Ductile Iron Pipe (□□□) length (km) ダクタイル鉄管(DIP)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/D □m | Service | N/D km |
|--------------|--------|---------|--------|

□-2. Cast Iron Pipe (C□□) length (km) 鑄鉄管(CIP)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/D □m | Service | N/D km |
|--------------|--------|---------|--------|

□-3. Steel Pipe (□□□) length (km) 鋼管(SP)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/D □m | Service | N/D km |
|--------------|--------|---------|--------|

□-4. Stainless Steel Pipe (□□□□) length (km) ステンレス鋼管(SUS)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/D □m | Service | N/D km |
|--------------|--------|---------|--------|

□-□. Concrete (Hume) Pipe (H□) length (km) コンクリート管(HP)延長(km)

| | |
|--------------|---------|
| Distribution | 1□.□0□m |
|--------------|---------|

□-□. Asbestos Cement Pipe (AC□) length (km) アスベスト管(ACP)延長(km)

| | | | |
|--------------|----------|---------|--------|
| Distribution | 20□.□2□m | Service | N/D km |
|--------------|----------|---------|--------|

□-□. Polyvinyl Chloride pipe (PVC) length (km) 硬質塩化ビニル管(PVC)延長(km)

| | | | | |
|--------------|---------|---------|-----|----|
| Distribution | 240.00m | Service | N/D | km |
|--------------|---------|---------|-----|----|

□-□. High Impact Vinyl pipe (HIVP) length (km) 高強度塩化ビニル管(HIVP)延長(km)

| | | | | | |
|--------------|-----|---|---------|-----|----|
| Distribution | N/D | m | Service | N/D | km |
|--------------|-----|---|---------|-----|----|

□-□. Polyethylene pipe (PEP) length (km) ポリエチレン管(PEP)延長(km)

| | | | | | |
|--------------|-----|---|---------|-----|----|
| Distribution | N/D | m | Service | N/D | km |
|--------------|-----|---|---------|-----|----|

□-10. Galvanized steel pipe (GP) length (km) 亜鉛メッキ鋼管(GP)延長(km)

| | | | | |
|--------------|-------|---------|-----|----|
| Distribution | 2012m | Service | N/D | km |
|--------------|-------|---------|-----|----|

□-11. Lead pipe (LP) length (km) 鉛管(LP)の延長(km)

| | | | | | |
|--------------|-----|---|---------|-----|----|
| Distribution | N/D | m | Service | N/D | km |
|--------------|-----|---|---------|-----|----|

□-12. Copper pipe (CP) length (km) 銅管(CP)の延長(km)

| | | |
|---------|-----|----|
| Service | N/D | km |
|---------|-----|----|

□-13. Other pipe length (km) その他の管の延長(km)

| Pipe material name | Distribution | Service |
|--------------------|--------------|---------|
| N/D | km | km |
| N/D | km | km |
| N/D | km | km |
| N/D | km | km |

□-14. Transmission pipeline length (km) 送水管延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|---------|---------|
| 0.04km | 10.00m | 10.00km | 10.02km |

□-1□. Distribution pipeline length (km) 配水管延長(km)

| 2011 | 2012 | 2013 | 2014 |
|---------|--------|--------|---------|
| 40.42km | 00.12m | 00.0km | 103.0km |

□-1□. Service pipeline length (km) 給水管延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|-------|--------|--------|
| N/D km | N/D m | N/D km | N/D km |

8. SCADA/Mapping system 水道情報データ管理／マッピングシステム

□-1. Describe the name of digital data filing 電子データ化している業務名

| |
|-----|
| N/D |
|-----|

□-2. Proportion of filing system of business management document (□) 事業文書の管理割合(%)

| paper filing | digital filing |
|--------------|----------------|
| N/D □ | N/D □ |

□-3. Proportion of filing system of water facilities drawing (□) 水道工事図面の管理割合(%)

| paper filing | digital filing |
|--------------|----------------|
| N/D □ | N/D □ |

9. Water meter and maintenance 水道メータ・修繕

□-1. Number of installed water meter (number) 水道メータ設置数(数)

| iameter | 13mm | 20mm | 2□mm | mm | mm | ther | otal |
|---------|------|------|------|-----|-----|------|------|
| Number | N/D | N/D | N/D | N/D | N/D | N/D | N/D |

□-2. Period of service of water meter (year) 水道メータ使用期間(年)

| |
|----------|
| N/D □ear |
|----------|

□-3. Number of annual purchase of water meter (number) 水道メータ年間購入数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/D | N/D | N/D | N/D |

□-4. Times of usage of maintained e□piry water meter (times)

満期水道メータの修理後の繰り返し使用回数(回)

| |
|-----|
| N/D |
|-----|

□-□. Number of damaged water meter (number) 破損水道メータ数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/D | N/D | N/D | N/D |

□-□. Number of intentional damaged water meter (number) 故意に破損された水道メータ数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/D | N/D | N/D | N/D |

□-□. Describe the reason of damaged/broken water meter 水道メータの破損理由の記述

N/D

10. Procurement / Stock management 資材調達・資材管理

10-1. Describe the procedure of procurement of water supply material 材料調達手段の記述

It is done through contractor after tendering procedure as per JIS A rules or regulation

10-2. Describe the management of spare parts 予備材料の管理方法

It is done through contractor after tendering procedure as per JIS A rules or regulation A
 JIS A L H N N-

Remarks

Transmission pipeline defines the pipeline between water treatment plant and distribution reservoir
 also between two distribution reservoirs.

DMA defines District Metered Area as same as District Metered Zone (DMZ).

The Hourly Factor defines non-dimension value which hourly maximum consumption volume divides
 hourly average one.

If no data answer is N/A else if no answer or non-applicable answer is N/A

Pressure unit

| | Ma | kgf/cm ² | bar | |
|---------------------|--------|---------------------|--------|-------|
| Ma | 1 | 10.20 | 1.033 | 14.0 |
| kgf/cm ² | 0.0981 | 1 | 0.981 | 14.22 |
| bar | 0.1013 | 1.033 | 1 | 14.0 |
| | 0.0098 | 0.0098 | 0.0098 | 1 |

Questionnaire on the Water Supply Business

Questionnaire 3: Tube Well

Name of organization ☐ A ☐ A- ☐

Please provide data for tube well as follows:

Q1 How many tube well are there in your town?

Answer: 67

Q2 Do you have the inventory of tube well ?

Answer: YES (List attached) Annex-B

If yes, please provide the inventory.

Q3 Do you have information of each tube well regarding well location, installation year, screen depth, maintenance record, operational hours, specification of pumps ?

Answer: YES

If yes, please provide these information.

Questionnaire on the Water Supply Business

Questionnaire 4: Sewerage and Drainage

Name of organization ☐ A ☐ A- ☐

A. Documents or information related to sewerage and drainage system in WASAs

(1) Please provide following maps.

- Location Plan of the City (including Area Boundary)
- Topography and Levels
- Served and Unserved Areas
- WASA administration Zones Boundary
- Location of Disposal stations
- Layout Plan of Existing Sewer System
- Layout Plan of Existing Drainage System
- Existing Drainage Route and Point of Final Disposal
- Proposed or planed Sewers and Drainages System
- Major Ponding Areas

(2) Please provide following rainfall data.

- Rainfall intensity (15, 30, 60 120 minutes, 3,6,9,12 hours duration)
- Fitted Intensity Duration Curve

B. Organization and finance

- (1) Please provide an actual organization chart of WASAs especially Sewers and Drainages cleaning (Engineers, Equipment operators, Sewer man, etc)
- (2) Please furnish an annual budget and disbursement in the WASAs and its breakdown for the last 5 years especially Sewers and Drainages cleanings.
- (3) Please explain the schedule and budget allocation for the implementation of the cleanings (operation/maintenance of the sewage and drainage system).

C. Equipment/Machinery

- (1) Please provide a list of equipment/machinery owned by WASAs as tabulated below (type of equipment, model, year of manufacturing, name of manufacturer and country, running hour/km, working condition, maintenance method, present location).

| Equipment | Model (Main Spec.) | Year | Manufacturer/ Country | Running hour/km | Working Condition | Maintenance method | Location |
|--------------------|-----------------------|------|--------------------------|--------------------|----------------------|-----------------------|------------|
| Wheel Excavator | PC200 | 1998 | Komatsu Japan | 6000hr | Under repair | Need overhaul | Motor pool |

- (2) Existing facilities or equipment for maintenance service available at the workshop of WASAs. N/A

- (3) Procedure of machine maintenance and process of daily/routine maintenance activity and preparation of activity's record/report.
- (4) Laws/Regulations of gas emission control for vehicles and construction equipment.
- (5) Average field working hours per day for Sewers and Drainages cleanings.
- (6) Current dredging method.
(E.g. one excavator/clamshell or two dump trucks of 10 ton load capacity)
- (7) Current sludge removal work from sewage pipes.
(E.g. one worker in manhole or one dump trucks of 2 ton load capacity)
- (8) Record of the accidents of construction equipment/machinery for the last 5 years
(E.g. overhead wire cutting, fall to channel, fuel shortage etc.)
- (9) With regard to disposal stations, the following information will be required (refer to Format 1)

- | | |
|--------------------------------------|--|
| or Name of disposal stations | or Established Year |
| or Pump Type | or Pump quantity |
| or Capacity of each pump (flow rate) | or Motor Power |
| or Operation hours per day | - Total capacity of disposal station (flow rate) |
| or Status of pump | or Final Discharge Point |

Format 1

| No. | Name of Lift Station | Established Year | Pump Type | Number and Capacity of Pumps (nos.) (kw) (m ³ /s) | | | Motor Power (kw) | Operation hour (hr/day) | Total Capacity (Cfs) (m ³ /s) | Status of Pump | Final Discharge Point |
|-----|----------------------|------------------|-----------|---|---|-----------|------------------|-------------------------|--|----------------|-------------------------|
| 1 | Maqbra More | 1985 | S | 1 | x | 2 (0.06) | | | 2 (0.06) | ok | River Ravi |
| 2 | Barkat Town | 1989 | S | 1 | x | 2 (0.12) | | | 2 (0.21) | ok | Farakhabad DS |
| 3 | Shahdara | 1990 | S | 1 | x | 6 (0.12) | | | 2 (0.68) | ok | River Ravi |
| 4 | Saeed Park | 1995 | S | 1 | x | 2 (0.12) | | | 2 (0.21) | ok | River Ravi |
| 5 | Faisal Park | 1995 | S | 1 | x | 2 (0.06) | | | 5 (0.15) | ok | Irrigation Distributary |
| 6 | Fazal Park | 1996 | S | 1 | x | 2 (0.06) | | | 18 (0.12) | ok | River Ravi |
| 7 | Madina | 2008 | S | 3 | x | 10 (0.29) | | | 38 (1.11) | ok | Shalimar Escape Drain |
| 8 | Dars Baray | 1982 | S | 2 | x | 2 (0.12) | | | 2 (0.12) | ok | Shalimar Escape |
| 9 | Toheed Park | 1992 | S | 2 | x | 2 (0.06) | | | 2 (0.12) | ok | Shalimar Escape |
| 10 | Shah Kamal | 1992 | S | 2 | x | 2 (0.06) | | | 2 (0.12) | ok | Shalimar Escape |
| 11 | Shalimar Link | 1984 | S | 3 | x | 6 (0.12) | | | 18 (0.51) | ok | Shalimar Escape |
| 12 | Lal Pul | 1998 | S | 3 | x | 2 (0.06) | | | 20 (0.12) | ok | Shalimar Escape Drain |
| 13 | Fayaz Park | 2001 | S | 1 | x | 2 (0.06) | | | 6 (0.12) | ok | Shalimar Escape Drain |

| No. | Name of Lift Station | Established Year | Pump Type | Number and Capacity of Pumps | | | Motor Power | Operation hour | Total Capacity | | Status of Pump | Final Discharge Point |
|-----|----------------------|------------------|-----------|------------------------------|------|---------------------|-------------|----------------|----------------|---------------------|----------------|-----------------------|
| | | | | (nos.) | (kw) | (m ³ /s) | (kw) | (hr/day) | (Cfs) | (m ³ /s) | | |
| 1 | Taj Bagh | 2008 | S | 2 | x | 6 (0.1) | | | 12 | (0.3) | ok | Shalimar Escape |
| 15 | B Block | 2008 | S | 1 | x | (0.12) | | | 10 | (0.29) | ok | Shalimar Escape Drain |
| | | | S | 1 | x | 6 (0.1) | | | | | | |
| 16 | Tajpura Main | 1990 | S | 1 | x | 25 (0.1) | | | 5 | (2.13) | ok | Shalimar Escape Drain |
| | | | | 2 | x | 25 (0.1) | | | | | | |

Note: V Vertical Axial Flow Pump, H Horizontal Axial Flow Pump, S Submersible Pump

Questionnaire on the Water Supply Business

Questionnaire 5-Gujranwala

Management, Finance and Organization

Name of organization: Gujranwala WASA

Management

Please answer the following questions and provide financial reports in recent three (3) years, current tariff tables and your organization chart to support your answers.

| | Questions | Please write your answers. | Reference document |
|---------------------------------|---|--|--------------------|
| vision, strategy | Existence of a long term plan | Answer <input type="checkbox"/> No comments () | N/D |
| Finance | Revenues | Year 2012 actual (35,18), 2013 actual (30,033), 2014 actual (33,035), 2015 estimated (30,232), 2016 planning (80,5B) | |
| | Costs | Year 2012 actual (303,023), 2013 actual (100,93), 2014 actual (60,606) 2015 estimated (50,600), 2016 planning (561,158) | |
| | Investment | Year 2012 actual (215,055), 2013 actual (115,282), 2014 actual (150.09), 2015 estimated (1669.86), 2016 planning (1200.63) | |
| | Main finance sources | What is your main finance source, e.g. water charge collection, subsidy, government finance (PC), assistance from donors Answer (Govt of Punjab ADP) | |
| Future expansion | What is your future expansion plan New water treatment plant (NILL) New sewage plant (Waste water treatment plant) Rehabilitation () How much do you need to implement the above plans (10388 million) | | N/D |
| Administration and organization | Organization chart | Number of staff in each division by grade. (list enclosed) | N/D |
| | Recruitment | Year 2012 actual (36), 2013 actual (NILL), | |

| | | | |
|---|--------------------------------------|---|--|
| | | 201□ actual (□8), 2015 estimated (66), 2016 planning (□5) | |
| | Retirement | Year 2012 actual (□), 2013 actual (6), 201□ actual (5), 2015 estimated (9), 2016 planning (9) | |
| | Communication among divisions | Do you have a regular cross-division meeting (e.g. once a month, once a week)□ Answer (DAILY) | |
| | Pipe distribution network map | Do you have a pipe distribution network map of your city□ Answer□Yes, No, Comments (YES) | |
| | Inventory List | Do you have a list of inventory, machinery and other fixed assets□ Answer□Yes, No, Comments (YES) | |
| | Customer database | Do you have a customer database□ Answer□Yes, No, Comments (YES) | |
| Training | Training program (actual) | What training have you conducted□ Answer (NILL) | |
| | Necessary Training in the future | What training do you need in the future□ Answer□ (Capacity Building) | |
| | Guidelines | Do you have textbooks or guidelines to give a lecture to your staff□ Answer□Yes, No, Comments (N□) | |
| | Budget for the training | How much is your annual budget for the training□ Answer (NILL) | |
| Relation with customers | Communication with customers | Do you have a regular meeting with customers (e.g. once a month, once a week)□ Answer□Yes, No, Comments (N□) | |
| | Complaints from customers | Do you keep recording customer complaints□ Answer□Yes, No, Comments (YES) | |
| Relation with other organizations□ WASAs, | Relation with other WASAs, suppliers | Do you have a regular meeting with other WASAs or suppliers (e.g. once a month, once a week)□ Answer□Yes, No, Comments (□nce a month) | |

| | | | |
|------------------------|--|--|-----|
| Government, and donors | Relation with the State Government | Do you have a regular meeting with the State Government (e.g. once a month, once a week) As per schedule Answer Yes, No, Comments () | N/D |
| | Relation with Tehsil Municipal Administrations | Do you provide some training for Tehsil Municipal Administrations Answer Yes, No, Comments (N) | |

Water Supply

The IBNET is International Benchmarking Network for Water and Sanitation Utilities, issued by the World Bank. I would appreciate if you answer the following questions, in reference to the data as of year 2010 on the web or data from the JICA report in July 2010

| Questions | Year 2006 data | Year 2010 data | Source | Please write current situations. |
|--|----------------|-----------------|--------|----------------------------------|
| ujranwala population | 1,00,000 | 1,00,000 | IBNET | 1800000 |
| Coverage with water service | 28.00% | 32.00% (30,000) | IBNET | 0% |
| Coverage with sewerage | 60% | 62% | IBNET | 0% |
| Water treatment capacity (m3/day) | | | N/A | N/A |
| Actual average treatment volume (m3/day) | | | N/A | N/A |
| Number of connections | | 36,000 | IBNET | 2935 |
| Network length (km) | | 30 km | IBNET | 9 km |
| Water production | 115.5 lpcd | 861.20 lpcd | IBNET | 12.2 lpcd |
| Total water consumption | 6.85 lpcd | 63.3 lpcd | IBNET | 0.6 lpcd |
| Residential consumption | N/A | 392.83 lpcd | IBNET | 2.9 lpcd |
| Losses in m3/km of the network a day | 120.05 m3/km | 503.35 m3/km | IBNET | 60.1 m3/km |
| Losses in % (Non Revenue Water) | 33.61% | 6.20% | IBNET | 39.01% |
| Revenues, US\$, Rs per M3 sold | 0.06 \$ | 0.02 \$ | IBNET | |
| Costs, US\$ per M3 sold | 0.06 \$ | 0.03 \$ | IBNET | 0.336 \$ |

| | | | | |
|---|-------------------------------|-------------------------|-------|----------------|
| Operation cost coverage | 1.01 | 0.6 | IBNET | |
| Revenue collection ratio | 19.06 % (2008) (year 2008) | 22.59% | IBNET | 30.8% |
| Labor costs vs. operation costs | | 35% | IBNET | 29.61% |
| Electrical energy costs vs. operation costs | | 6% | IBNET | 30.39% |
| Contracted or service costs vs. operation costs | | 19% | IBNET | 31.23% |
| Total staff number | | 636 persons (year 2011) | JICA | 32 persons |
| Staff per 1,000 connections | | 21.1staff (2011) | JICA | 5.61 |
| Water supply hours a day | | 11 hours a day (2011) | JICA | 10-12 hour/day |
| Water meter installation ratio | | N/A | JICA | n/a |
| Average monthly tariff | | 100 Rs (2011) | JICA | 100 Rs |
| Revenue collection ratio | | 33.3(2011) | JICA | 30.8 |
| New connection installation fee | | 900 Rs (2011) | JICA | Rs 600 |
| Annual costs per a connection (Rs) | | 110 Rs (2011) | JICA | |
| Annual Complaints | | 15,21 complaints (2011) | JICA | 113 |

Annexage

| Questions | Year 2011 data | Source | Please write current situations. |
|---------------------------------------|----------------|--------|----------------------------------|
| Coverage with sewage | 65% | JICA | 0% |
| Sewage capacity (m3/day) | | JICA | 1305825 m3/day |
| Actual average sewage volume (m3/day) | | JICA | 68205m3/day |
| Sewage network length (km) | 380 km | JICA | 393 km |
| Drainage network length (km) | 1 km | JICA | 1 km |
| Drainage pump stations | 23 stations | JICA | 26 |

| | | | |
|---------------|------|------|---|
| Sewage plants | Zero | JICA | 0 |
|---------------|------|------|---|

Thank you for your answers.

List of Annexures

Gujranwala

| | |
|------------|---|
| Annexure A | Questionnaire 1, Question 4.4 WASA, Water Tariffs |
| Annexure B | Questionnaire 3, Question 2 Inventory of Tube Well |
| Annexure C | Questionnaire 4.7 List of Machinery |

GOVERNMENT OF THE PUNJAB

THE PUNJAB GAZETTE

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WASA (GDA) Gujranwala

From: 01-07-2003

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مجاہد - تحصیل مہنگہ (پٹی) کی سرحد
تحصیل مہنگہ (پٹی) کی سرحد

مجاہد - تحصیل مہنگہ (پٹی) کی سرحد
وہا (پٹی) کی سرحد

744 - 7-12-2004

غواڑ - مالی بحران و وہا (پٹی) کی سرحد

حوالہ آپ کی مہنگہ (پٹی) کی سرحد

کہ تحصیل مہنگہ (پٹی) کی سرحد آپ کی سرحد
اور تحصیل مہنگہ (پٹی) کی سرحد آپ کی سرحد
مستندہ قوت 6/12/2003 میں بذریعہ پٹرولیشن برآمد ہوا ہے
شہر مہنگہ (پٹی) کی سرحد چارٹر کی مہنگہ (پٹی) کی سرحد
ہذا آپ مطلع ہیں۔ نقل پٹرولیشن مہنگہ (پٹی) کی سرحد

تحصیل مہنگہ (پٹی) کی سرحد

مہنگہ

Mahangha

132

THE PUNJAB G.

| | | |
|-----------------|-------|----|
| Dyer shops | | Rs |
| Beco | Light | Rs |
| Industries | | |
| Bath | room | Rs |
| accessories | | |
| Dying factories | | Rs |

HOTELS & RESTAURANTS

| | |
|--------------------------------------|----------|
| Air conditioned Hotel. | Rs me |
| Without A.C. per room (flush system) | Rs me |
| Restaurant with A.C. | Rs |
| Restaurant without A.C. | Rs |
| Tea stall | Rs |

GOVERNMENT & PRI

| | |
|-----------------------------------|----|
| Offices upto 100 employees. | Rs |
| Offices upto 101 to 200 employees | Rs |
| Banks | Rs |

SCHOOLS/COLLEGES

| | |
|-------------------------------|-----|
| Above Primary upto Matric. | Rs. |
| College | Rs. |

PRIVATE HOSPITALS

| | |
|----------------------------|-----------------|
| 1-10 marlas | R ₁₀ |
| 11 marlas to 2 kanal | R ₂₀ |
| Morethan 2 kanals | R ₂₅ |
| Part time private clinic | R ₂₅ |
| Connection for general use | R ₂₅ |
| Public Parks | R ₂₅ |

10/10/10

201-5

تصريحاً عن اجماع الكليّة صاحب نواب ما يتم من قبله في هذا الموضع

جواب حافظ لیتوب آباد
فہرست و کتاب خانہ

الاجتماعيان يان!

Convenior/Member
Residence: 101 John Calhoun Ct, Olathe

نعت رسول و قبول

ما اَنْتَ تَاخُذُكَ لَعْنَةُ اُولٰٓئِكَ

989 55 11

City of New York Member
of the Board of Education

تشیق کی جاتی ہے۔

امام حسن بن علی علیهما السلام

الرحمة الطاهرة

ہیں آتی جاتی۔ اللہ عزوجل
کے لئے ہر شے اچھا ہے۔

مطابق با ج. ۱۰۰

Convenio Member

Size Panel 12.5 x 10.5 Council City AR

U. b. 10

سورۃ

9/1/91
Convenor Member

my friend, I am not a doctor, but I am a

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THE PUNJAB GAZETTE (EXTRAORDINARY) FEBRUARY 12, 2004

33

THE PUNJAB GAZ

WATER AND SEWERAGE CHARGES OF WASA (GDA), PROPOSED BY THE COMMITTEE CONSTITUTED BY THE GOVERNING BODY FOR WASA/GDA, FROM 01-07-2003

| PLOT SIZE | EXISTING WATER AND SEWERAGE RATES | RATES RECOMMENDED BY THE COMMITTEE CONSTITUTED BY ZILA NAZIM GRW. | RATES APPROVED BY THE TEHSIL COUNCIL CITY IN ITS MEETING HELD ON 6-12-2003 GRW. |
|--------------------|-----------------------------------|---|---|
| 1-3 Marla | Rs.75/- | Rs. 80+20=100/- | Rs.70+20= Rs.90/- |
| 3-5 marla | Rs.75/- | Rs.120+30=Rs.150/- | Rs.80+20= Rs.100/- |
| 5-7 marlas | Rs.75/- | Rs.160+40=Rs.200/- | Rs.100+25=Rs.125/- |
| 7-10 marlas | Rs.75/- | Rs.200+50=Rs.250/- | Rs.120+30=Rs.150/- |
| 10-20 marlas | Rs.225/- | Rs.225+75=Rs.300/- | Rs.200+50=Rs.250/- |
| 1 kanal to 2 kanal | Rs.250/- | Rs.400+100=Rs.500/- | Rs.250+75=Rs.325/- |
| Above 2 kanal | Rs.375/- | Rs.600+150=Rs.750/- | Rs.500+100=Rs.600/- |

EW WATER SUPPLY CC

| | |
|--------------------|--------------------------------|
| 10 marlas | Rs.350 (dome) Rs.500 (comm) |
| 1 marlas and above | Rs.500 (dome) Rs.750 (comm) |

SEWERAGE CONNECTION

| | |
|---------------------------------|--------|
| Domestic | Rs.300 |
| Commercial | Rs.100 |
| Industries | Rs.100 |
| Domestic Fee for Water Supply | Rs.200 |
| Commercial Fee for Water Supply | Rs.200 |

OTE:- Sewerage Tax
Sewerage Tax

COMMERCIAL (RATE PER MONTH)

| | | | |
|--------------------|----------|--------------------|--------------------|
| 1-10 marlas | Rs.300/- | Rs.100+25=Rs.125/- | Rs.100+25=Rs.125/- |
| 10-20 marlas | Rs.300/- | Rs.200+50=Rs.250/- | Rs.250+50=Rs.250/- |
| 1 kanal to 2 kanal | Rs.300/- | Rs.250+65=Rs.315/- | Rs.250+65=Rs.315/- |
| Above 2 kanal | Rs.300/- | Rs.300+75=Rs.375/- | Rs.300+75=Rs.375/- |

INDUSTRIES (SEWERAGE CHARGES ONLY) (RATES PER MONTH)

| | | | |
|-----------------------------------|------------|---------------------------------------|---------------------------------------|
| 1-10 marlas | Rs.1000/- | Rs.100/- | Rs.100/- |
| 10-20 marlas | Rs.1000/- | Rs.200/- | Rs.200/- |
| 1 kanal to 2 kanal | Rs.1000/- | Rs.250/- | Rs.250/- |
| Above 2 kanal | Rs.1000/- | Rs.300/- | Rs.300/- |
| Multi National Beverage Factories | Rs.10000/- | Rs.12000/- | Rs.12000/- |
| Floor Mills | Rs.2000/- | Rs.200/- per body (Rs.1000/- minimum) | Rs.200/- per body (Rs.1000/- minimum) |
| Tanneries | Rs.1000/- | Rs.1000/- | Rs.2000/- |
| Metal works | Rs.400/- | Rs.200/- | Rs.200/- |
| Paper Board Mills | Rs.1000/- | Rs.1500/- | Rs.2000/- |
| Cold Drinks Factories | Rs.5000/- | Rs.6000/- | Rs.6000/- |
| Ice Factories | Rs.1000/- | Rs.2000/- | Rs.3000/- |

Deputy Director Revenue
WASA(GDA), Gujranwala.

Managing Director,
Water & Sanitation Agency
Gujranwala.

1. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$
 2. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$
 3. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

سید محمد علی

نجات رسول

ما لکم من انبیاء
اجل من عام
اجل من عام
اجل من عام
اجل من عام
و غیره

عنوان = مانی حیا
توت فصل مه
حکایت پنهان
= مانی حیا
یا بیت تندی
برای غرض
الوان من پیش
والرابط

Managing Director,
Union Production Agency

FEBRUARY 12, 2004

331

THE PUNJAB GAZETTE (EXTRAORDINARY) FEBRUARY 12, 2004

EXTRAORDINARY

DA), PROPOSED BY
RNING BODY FOR

NEW WATER SUPPLY CONNECTION FEE

| | | | |
|--------------------|--|--|--|
| -10 marlas | Rs.350/- (domestic) Rs.500/- (commercial) | Rs.350/- (domestic) Rs.500/- (commercial) | Rs.350/- (domestic) Rs.500/- (commercial) |
| 1 marlas and above | Rs.500/- (domestic) Rs.750/- (commercial) | Rs.500/- (domestic) Rs.750/- (commercial) | Rs.500/- (domestic) Rs.750/- (commercial) |

RATES APPROVED
BY THE TEHSIL
COUNCIL CITY IN
ITS MEETING
HELD ON 6-12-2003
GRW.

Rs.70+20=Rs.90/-

Rs.80+20=Rs.100/-

Rs.100+25=Rs.125/-

Rs.120+30=Rs.150/-

Rs.200+50=Rs.250/-

Rs.250+75=Rs.325/-

Rs.500+100=Rs.600/-

SEWERAGE CONNECTION SECURITY FEE.

| | | | |
|------------------------------------|-----------|-----------|-----------|
| Domestic | Rs.300/- | Rs.300/- | Rs.300/- |
| Commercial | Rs.1000/- | Rs.1000/- | Rs.1000/- |
| Industries | Rs.1000/- | Rs.2000/- | Rs.2000/- |
| Domestic Fee for Water Supply | Rs.200/- | Rs.350/- | Rs.350/- |
| Commercial Fee for Water Supply | Rs.200/- | Rs.500/- | Rs.500/- |

NOTE:-

Sewerage Tax with water supply connection 75% of water rates.
Sewerage Tax without water supply connection 50% of water rates.

Rs.100+25=Rs.125/-

Rs.250+50=Rs.250/-

Rs.250+65=Rs.315/-

Rs.300+75=Rs.375/-

Deputy Director Revenue
NASA(GDA), Gujranwala.Deputy Director (Admn)
NASA (GDA), Gujranwala, Managing Director
Water & Sanitation
Gujranwala

(MONTH)

Rs.100/-

Rs.200/-

Rs.250/-

Rs.300/-

Rs.12000/-

Rs.200/- per body
(Rs.1000/- minimum)

Rs.2000/-

Rs.200/-

Rs.2000/-

Rs.6000/-

Rs.3000/-

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3 THE PUNJAB GAZETTE (EXTRAORDINARY) FEBRUARY 12, 2004. EXTRAORDINARY ISSUE

| | | | |
|-------------------------------|----------------------------|----------|----------|
| Supply through water tankers. | Rs.200/- per tanker/bozzel | Rs.250/- | Rs.250/- |
|-------------------------------|----------------------------|----------|----------|

COMMERCIAL SEWERAGE RATES (OTHER THAN INDUSTRY) (R month).

| | | | |
|---------------------------------------|-------------------|--------------------------------|---------------|
| Cinema Hall | Rs.300/- | Rs.300/- | Rs.1000/- |
| Marriage Hall | Rs.500/- | Rs.500/- | Rs.1000/- |
| Service Station | Rs.500/- | Rs.300/- Lift Rs.600/- Min. | Rs.1000/- |
| Hair Dresser | Rs.300/- | Rs.100/- | Rs.100/- |
| Hair Dresser with baths. | Rs.300/- | Rs.300/- | Rs.300/- |
| Toilet at public places (corporation) | Rs.200/- | Rs.500/- | Rs.500/- |
| Dry clean shop | Rs.200/- | Rs.100/- | Rs.200/- |
| Beauty parlor | Rs.300/- | Rs.100/- | Rs.200/- |
| Insurance Co. | Rs.100/- | Rs.100/- | Rs.500/- |
| X-Ray Clinic Laboratories. | Rs.100/- | Rs.100/- | Rs.200/- |
| Bakers | Rs.200/- | Rs.200/- | Rs.300/- |
| Animal | Rs.50/-per cattle | Rs.20/- | Rs.20/-p.anim |
| Bus body maker | Rs.200/- | Rs.200/- | Rs.200/- |
| Jewellers | Rs.100/- | Rs.100/- | Rs.100/- |
| Jali Makers | Rs.200/- | Rs.200/- | Rs.250/- |
| Charga House & Tika Shops | Rs.300/- | Rs.300/- | Rs.400/- |
| Goods Transport | Rs.200/- | Rs.200/- | Rs.200/- |

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CORRIGENDUM

In part:
regarding Water R
approved by the T.
notified in the Punja
regarding Sewerag
Notification mentio
Administration (City

ACQUAFER CHARGES

| | | | |
|---------|---------------------|-------------------|---------------|
| 1 Cusic | Rs.5000/- per month | Rs.5000/- p.month | Rs.5000/- p.m |
| ½ cusic | Rs.2500/- p.month | Rs.2500/- p.month | Rs.2500/- p.m |

1. Sewerage C
2. Sewerage C

NOTE:- Rates to increase or decrease in proportionate to the rate of one cusic.

al
Managing Director
Water & Sanitation
Gujranwala

Price Rs. 2.00

FEBRUARY 12, 2004

331

THE PUNJAB GAZETTE (EXTRAORDINARY) FEBRUARY 12, 2004

EXTRAORDINARY

DA), PROPOSED BY
TRAINING BODY FORRATES APPROVED
BY THE TEHSIL
COUNCIL CITY IN
ITS MEETING
HELD ON 6-12-2003
GRW.

Rs.70+20=Rs.90/-

Rs.80+20=Rs.100/-

Rs.100+25=Rs.125/-

Rs.120+30=Rs.150/-

Rs.200+50=Rs.250/-

Rs.250+75=Rs.325/-

Rs.500+100=Rs.600/-

Rs.100+25=Rs.125/-

Rs.250+50=Rs.300/-

Rs.250+65=Rs.315/-

Rs.300+75=Rs.375/-

(MONTH)

Rs.100/-

Rs.200/-

Rs.250/-

Rs.300/-

Rs.12000/-

Rs.200/- per body
(Rs.1000/- minimum)

Rs.2000/-

Rs.200/-

Rs.2000/-

Rs.6000/-

Rs.3000/-

NEW WATER SUPPLY CONNECTION FEE

| | | | |
|--------------------|--|--|--|
| 10 marlas | Rs.350/- (domestic) Rs.500/- (commercial) | Rs.350/- (domestic) Rs.500/- (commercial) | Rs.350/- (domestic) Rs.500/- (commercial) |
| 1 marlas and above | Rs.500/- (domestic) Rs.750/- (commercial) | Rs.500/- (domestic) Rs.750/- (commercial) | Rs.500/- (domestic) Rs.750/- (commercial) |

SEWERAGE CONNECTION SECURITY FEE

| | | | |
|------------------------------------|-----------|-----------|-----------|
| Domestic | Rs.300/- | Rs.300/- | Rs.300/- |
| Commercial | Rs.1000/- | Rs.1000/- | Rs.1000/- |
| Industries | Rs.1000/- | Rs.2000/- | Rs.2000/- |
| Domestic Fee for Water Supply | Rs.200/- | Rs.350/- | Rs.350/- |
| Commercial Fee for Water Supply | Rs.200/- | Rs.500/- | Rs.500/- |

NOTE:-

Sewerage Tax with water supply connection 25% of water rates.

Sewerage Tax without water supply connection 50% of water rates.

Deputy Director Revenue
NASA(GDA), Gujranwala.Deputy Director (Admn)
P.S.A (GDA) Gujranwala, Managing Director
Water & Sanitation
Gujranwala

regarding

approval

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regarding

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FEBRUARY 12, 2004 EXTRAORDINARY ISSUE

REGISTERED No. L-7532



The Punjab Gazette

PUBLISHED BY AUTHORITY

LAHORE THURSDAY SEPTEMBER 02, 2004

WATER AND SANITATION AGENCY
(GDA) GUJRANWALA

CORRIGENDUM REGARDING WATER AND SEWERAGE CHARGES OF WASA (GDA) GUJRANWALA

In partial modification of Notification No. L-7532 dated 12-02-2004 regarding Water Rate / Sewerage Charges of WASA(GDA) Gujranwala as approved by the Tehsil Municipal Administration (City) Council Gujranwala and notified in the Punjab Gazette vide No. L7532 dated 12-02-2004 the following items regarding Sewerage Charges for Slaughter House may be read at the end of the Notification mentioned above which has been approved by the Tehsil Municipal Administration (City) Council Gujranwala during the meeting held on 30-07-2003:-

- | | |
|---|------------------|
| 1. Sewerage Charges for each Cow/Buffalo etc. | Rs.2.00 per head |
| 2. Sewerage Charges for each Goat/Sheep etc. | Rs.1.00 per head |

[Signature]
Managing Director
Water and Sanitation Agency
(GDA) Gujranwala

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[Signature]
Managing Director
Water and Sanitation Agency
(GDA) Gujranwala

Price Rs. 2.00 Per Page

(873)

ORDINARY ISSUE

REGISTERED No. L-7537



The Punjab Gazette

PUBLISHED BY AUTHORITY

LAHORE TUESDAY SEPTEMBER 28, 2010

WATER AND SANITATION AGENCY
(GDA) GUJRANWALA

NOTIFICATION

No. WASA/Admin/674


Dated: 22-09-2010


ADDENDUM REGARDING WATER AND SEWERAGE CHARGES OF WASA (GDA) GUJRANWALA.

In continuation of Notification No.L-7532 dated 12-02-2004 issued by the Government Printing Press, Punjab regarding Water/Sewerage Charges of WASA (GDA) Gujranwala, the per month rates of following new categories as approved by the Governing Body of WASA/GDA in its 41st meeting held on 06-08-2010 are hereby added.

| S.No. | Category | Water + Sewerage Charges | Sewerage Charges only |
|-------|---|--------------------------|-----------------------|
| 1 | Leather factory/ceramics industry, textile mills, | Rs.1500+1000=Rs.2500/- | Rs.2000/- |
| 2 | Swimming Pool (seasonal) | Rs.2000+1500=Rs.3500/- | Rs.3000/- |
| 3 | Petrol pumps/CNG station | Rs.1500+500=Rs.2000/- | Rs.1000/- |
| 4 | Plaza (per marla covered area per floor) | Rs.100+50=Rs.150/- | Rs.100/- |

The above mentioned categories may be read at the end of the existing water rates.


Deputy Director (Rev)
WASA (GDA) Gujranwala


Director (Admin & Fin)
WASA (GDA) Gujranwala


Managing Director
WASA (GDA) Gujranwala

EXTRAORDINARY ISSUE

REGISTERED No. L-7532



The Punjab Gazette

PUBLISHED BY AUTHORITY

LAHORE THURSDAY NOVEMBER 25, 2010

WATER AND SANITATION AGENCY
(GDA) GUJRANWALA

NOTIFICATION

No. WASA/Admn/ 759

Dated:- 02/11/2010

INFRASTRUCTURE COST/DEVELOPMENT CHARGES/BETTERMENT FEE FOR
WATER SUPPLY, SEWERAGE/DRAINAGE SYSTEM FOR PRIVATE HOUSING
COLONIES/UNITS/USERS UNDER SECTION 22 & 23 OF THE PUNJAB
DEVELOPMENT OF CITIES ACT 1976.

In continuation of Notification No. L-7532 dated 12-02-2004 issued by the Government Printing Press, Punjab regarding Water/Sewerage Charges of WASA (GDA) Gujranwala, following new charges for Private Housing Colonies/Units/Users/ have been approved by the Governing Body of WASA/GDA in its 41st meeting held on 06-08-2010, are hereby added in the existing rates:

- If residents of private/Government Department Colony require to lay water supply and sewer/drainage system on self-help basis, they shall pay Rs.1000.00 extra once for each connection for water supply or sewerage/drainage as infrastructure cost/charges after getting approval from WASA.
- For NOC from WASA, the private developers will pay Rs. 1000.00 per Marla once as infrastructure cost/charges each for water supply and sewer/drainage system on the saleable area. The Rs. 10000.00 per Acre one time will be charged as supervision charges before obtaining NOC.
- Those private colonies that have already connected with WASA system, the residents of these colonies will pay Rs. 1000.00 per connection one time extra once for water supply and sewer/drainage along with regular water supply/sewerage charges from the date of connection. The Rs. 10000.00 per Acre one time will be charged as supervision charges.

The above mentioned rates may be read at the end of above mentioned Notification.

Director (A & F)
WASA (GDA) Gujranwala

Managing Director
WASA (GDA) Gujranwala

LIST OF TUBEWELLS WASA GUJRANWALA

| Sr.# | Tube Well Location | Capacity |
|----------------|-------------------------------|-----------------|
| Zone-I | | |
| 1. | Madina Colony, Jinnah Road | 4 Cusec |
| 2. | Bhecopura | 2 Cusec |
| 3. | Hamilton Road | 2 Cusec |
| 4. | Commissioner Office | 2 Cusec |
| 5. | Khokharki | 2 Cusec |
| 6. | Session Court, Sialkot Road | 2 Cusec |
| 7. | Camp No.4 Civil Line | 2 Cusec |
| 8. | Saleem colony | 2 Cusec |
| 9. | Liaqat Bagh (Park) | 4 Cusec |
| 10. | Liaqat Bagh | 4 Cusec |
| 11. | Liaqat Bagh (Office) | 2 Cusec |
| 12. | Zero Point Pasroor Road | 2 Cusec |
| 13. | Satellite Town B-Block | 2 Cusec |
| 14. | Wahdat Colony | 4 Cusec |
| 15. | Dera Jamshed | 2 Cusec |
| 16. | Chaman Shah (CIA) | 2 Cusec |
| 17. | Chaman Shah (Park) | 2 Cusec |
| 18. | WASA Residence Haidery Road | 2 Cusec |
| 19. | Peoples Colony (W-Block) | 2 Cusec |
| 20. | Peoples Colony (W-Block) | 2 Cusec |
| 21. | Haidery Road | 2 Cusec |
| 22. | Peoples Colony (X-Block) | 2 Cusec |
| 23. | Peoples Colony (X-Block) | 2 Cusec |
| 24. | Behari Colony | 2 Cusec |
| 25. | Nigar Phatak | |
| Zone-II | | |
| 26. | Dawood Wala Khu | 2 Cusec |
| 27. | Muhammadi Town | 2 Cusec |
| 28. | Madina Colony Khiali | 2 Cusec |
| 29. | Tower Road Khiali | 2 Cusec |
| 30. | Main Bazar Sarfraz Colony | 2 Cusec |
| 31. | Khiali OHR | 2 Cusec |
| 32. | Jinnah Park G.T Road | 2 Cusec |
| 33. | Nowshera Road D/Station | 2 Cusec |
| 34. | Bahtha Colony Nowshera Sansi | 2 Cusec |
| 35. | Sialvi Town | 4 Cusec |
| 36. | Jinnah Road | 4 Cusec |
| 37. | Nowshera Road OHR | 4 Cusec |
| 38. | Saghir Park, Nowshera Road | 2 Cusec |
| 39. | Nowshera Road OHR | 2 Cusec |
| 40. | Khalifa Aslam Park 1 | 2 Cusec |
| 41. | Khalifa Aslam Park 2 | 2 Cusec |
| 42. | Prao Chowk | 2 Cusec |
| 43. | Sheranwala Bagh Ladies Park 1 | 2 Cusec |

| | | |
|-----------------|---------------------------------|---------|
| | Sheranwala Bagh Ladies Park 2 | 2 Cusec |
| 45. | Sheranwala Bagh (Wrestling) | 2 Cusec |
| 46. | Sheranwala Bagh WAPDA office | 2 Cusec |
| 47. | Nian Chowk | 2 Cusec |
| Zone-III | | |
| 48. | Camp No. 2 Gurunanak Pura | 2 Cusec |
| 49. | Jannat Bibi Park | 2 Cusec |
| 50. | Islamia College | 2 Cusec |
| 51. | Garjakh Graveyard | 2 Cusec |
| 52. | Rehman Pura | 2 Cusec |
| 53. | Eid Gah Qaddafi Road | 2 Cusec |
| 54. | Hameed Pura Rasheed Colony | 2 Cusec |
| 55. | Rose Garden Hall Hafizabad Road | 2 Cusec |
| 56. | PHED Model Town | 2 Cusec |
| 57. | WASA office Model Town | 4 Cusec |
| 58. | Comprehensive school Model Town | 2 Cusec |
| 59. | A-Block Model Town OHR | 2 Cusec |
| 60. | Central Park Model Town | 4 Cusec |
| 61. | Gondlanwala Road | 2 Cusec |
| 62. | Small Estate, Model Town | 2 Cusec |
| 63. | Govt. High school Dhullay | 4 Cusec |
| 64. | Gulshan Iqbal Park | 4 Cusec |
| 65. | Pasban Colony | 2 Cusec |
| 66. | Afzal Pura, Jannat Town | 2 Cusec |
| 67. | Munji Ground | 2 Cusec |
| 68. | Dhullay Chowk | 2 Cusec |

LIST OF MACHINERY WASA GUJRANWALA

Annex - C

| Equipment | Year | Registration No. | Manufacturer / Country | Consumption | Working Condition | Location |
|---------------------------|------|------------------|------------------------|----------------|-------------------|----------|
| Mazda Truck | 1999 | GAL 5761 | Mazda | 5 litre / km | OK | Zone-I |
| Heavy Duty Sucker | 2007 | GAJ 50 | Hino | 2 litre / km | OK | Zone-I |
| Medium Duty Sucker | 2007 | GAJ 57 | Hino | 5 litre / km | OK | Zone-I |
| Heavy Duty Jetting | 2007 | GAJ 53 | Nissan | 2 litre / km | OK | Zone-I |
| Medium Duty Jetting | 2007 | GAJ56 | Hino | 5 litre / km | OK | Zone-I |
| Water Boozer | 2007 | GAJ 1034 | Hino | 3 litre / km | OK | Zone-I |
| Fuel tanker | 2015 | GAJ 60 | Isuzu | 5 litre / km | OK | Zone-I |
| Large Excavator | 2007 | | Hyundai | 25 litre / hr | Need Overhauling | |
| Mazda Truck | 1999 | GAJ 5763 | Mazda | 5 litre / km | OK | Zone-III |
| Mazda Truck | 1999 | GAL 5762 | Mazda | 5 litre / km | OK | Zone-II |
| Small Excavator | 2007 | --- | Doosan | 7 litre / hour | OK | Zone-II |
| Heavy Duty Sucker | 2007 | GAJ 49 | Hino | 2 litre / km | OK | Zone-II |
| Medium Duty Sucker (Blue) | 1999 | GAL 5760 | Hino | 5 litre / km | OK | Zone-II |
| Medium Duty Sucker | 2007 | GAJ 56 | Hino | 5 litre / km | OK | Zone-II |
| Heavy Duty Jetting | 2007 | GAJ 51 | Nissan | 2 litre / km | OK | Zone-II |
| Heavy Duty Jetting | 2007 | --- | Nissan | 2 litre / km | OK | Zone-II |
| Mobile Dewatering Vehicle | 2012 | --- | Isuzu | 5 litre / km | OK | Zone-II |
| Heavy Duty Sucker | 2003 | GAJ 1037 | Hino | 2 litre / km | OK | Zone-III |
| Medium Duty Sucker | 2007 | GAJ 58 | Hino | 5 litre / km | OK | Zone-III |
| Heavy Duty Jetting | 2007 | GAJ 52 | Nissan | 2 litre / km | OK | Zone-III |
| Medium Duty Jetting | 2007 | GAJ54 | Hino | 5 litre / km | OK | Zone-III |
| Water Boozer | 2007 | GAJ 1035 | Hino | 3 litre / km | OK | Zone-III |
| Mobile Dewatering Vehicle | 2015 | --- | Isuzu | 5 litre / km | OK | Zone-III |

WASA

MULTAN

Questionnaire on the Water Supply Business

Questionnaire 1: Information of WASA in Punjab Province

1. City information 都市の情報

1-1. Name of water supply organization that performs water supply service 水道事業者名称

Water and sanitation agency Multan

1-2. Name of city that performs water supply service 水道事業を行う都市の名称

Multan

1-3. Population of water service area (person) 給水都市の人口(人)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 1.32 | 1.43 | 1.43 | 1.43 |

1-4. City area (km²) 都市の面積(km²)

| Total area | Water supply area |
|---------------------|-----------------------|
| 562 km ² | 365.3 km ² |

1-5. Number of service connection (number of water meter) 給水(契約)戸数(戸、水道メータ数)

| 2011 | 2012 | 2013 | 2014 |
|------|-------|-------|-------|
| N/A | 53760 | 60608 | 66900 |

1-6. Population served by water supply as percentage of total population (%) 水道普及率(%)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 50% | 60% | 60% | 65% |

2. Water resource / Water treatment 水源／浄水

2-1. Water resource (m³/day) 水源(m³/日)

| Surface (River / Dam) | Groundwater | Seawater | Other |
|-----------------------|------------------------------|----------|-------|
| N/A | 97287.67 m ³ /day | N/A | N/A |

2-2. Method of water intaken 取水方式

Ground water bulk supply through pumping.

2-3. Number and capacity of Water Treatment Plant (WTP) (number, m³) 浄水場数と処理能力(箇所、m³)

| Number of WTP | Total capacity (m ³ /day) |
|---------------|--------------------------------------|
| N/A | N/A |

| No. | WTP Name | Built year | Capacity | Treatment volume (average) |
|-----|----------|------------|----------|----------------------------|
| | N/A | N/A | N/A | N/A |
| | N/A | N/A | N/A | N/A |
| | N/A | N/A | N/A | N/A |

2-4. Name and dosing rate of coagulant (mg/L) 凝集剤名称および注入率(mg/L)

| Name of coagulant | Dosing rate of coagulant (mg/L) |
|-------------------|---------------------------------|
| N/A | N/A |

2-5. Type of sedimentation and filtration 沈殿・ろ過の種類

| | |
|-----------------------|-----|
| Type of sedimentation | N/A |
| Type of filtration | N/A |

2-6. Filtration speed rate (m/day) ろ過速度(m/day)

| Slow sand filter | Rapid sand filter |
|------------------|-------------------|
| N/A | N/A |

2-7. Name and dosing rate of disinfection (mg/L) 消毒剤名称および注入率(mg/L)

| Name of disinfection | Dosing rate of disinfection (mg/L) |
|----------------------|------------------------------------|
| N/A | N/A |
| N/A | N/A |

2-8. Number and capacity of distribution reservoir (number, m³) 配水池数と容量(箇所、m³)

| Number | Total capacity (m) | Minimum reservoir (m ³) | Maximum reservoir (m ³) |
|--------|--------------------|-------------------------------------|-------------------------------------|
| N/A | N/A | N/A | N/A |

2-9. Production cost of water treatment (PHP/m³) 造水コスト(PHP/m³)

| | |
|-----|-----|
| N/A | N/A |
|-----|-----|

2-10. Number of items of water quality inspection (number) 水質検査項目数(数)

| Everyday | Every week | Every month | Every year |
|----------|------------|-------------|------------|
| N/A | N/A | 12 | N/A |

2-11. Hour of water suspension and supply turbidity water (times, hour/year) 断水・濁水時間(時間/年)

| | Number of times | Total hours |
|------------------------|-----------------|-------------|
| Water suspension | N/A | N/A |
| Supply turbidity water | N/A | N/A |

2-12. Describe the problem about water treatment 浄水処理の問題点の記述

| |
|-----|
| N/A |
|-----|

3. Organization 組織体制

3-1. Total number of KCWN staff member (person) 職員数(人)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/A | 202 | 202 | 202 |

3-2. Total number of engineer staff member (person) 技術職員数(人)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 3 | 3 | 2 | 2 |

3-3. Proportion of staff member according to staff's age (%) 職員年齢構成(%)

| 10's – 20's | 30's | 40's | 50's – |
|-------------|------|------|--------|
| 0% | 25% | 60% | 15% |

3-4. Proportion of staff member's business experience of water supply (%) 職員経験年数構成 (%)

| – 5 years | 5 – 10 years | 10 – 20 years | 20 – 30 years | 30 years – |
|-----------|--------------|---------------|---------------|------------|
| 0% | 25% | 60% | 15% | 0% |

3-5. Hour of staff's training (times/person, hour/year/person) 職員研修時間(回/人、時間/人)

| | Inner training (exclude OJT) | | Outsourcing | |
|------------------|------------------------------|-------------------|--------------|-------------------|
| | Times/person | Total hour/person | Times/person | Total hour/person |
| Engineer | N/A | N/A | 2 | 32/hours |
| Exclude engineer | N/A | N/A | 8 | 32/hours |

4. Water tariff 水道料金

4-1. Price and consumption of domestic and commercial use (PHP, m³, average per month)

家事・業務用水道料金・使用水量(PHP/m³: 平均額)

| | Price | Average Consumption |
|----------------|-------|---------------------|
| Domestic use | N/A | N/A |
| Commercial use | N/A | N/A |

4-2. Collection frequency (month) 水道料金徴収間隔(月)

| |
|-------------|
| Every Month |
|-------------|

4-3. Collection rate of water charge (%) 水道料金徴収率(%)

| Domestic use | Commercial use |
|--------------|----------------|
| 92.277% | 7.722% |

4-4. Describe/Attach the water tariff table 水道料金表の記載

| AREA OF PLOT | MONTHLY CHARGES (RS./MONTH) | | | |
|--------------------|-----------------------------|--------------------------------------|--------------------|--------------------------------------|
| | WATER SUPPLY TARIFF | | SEWERAGE TARIFF | |
| | Existing | Approved by the Governing Body | Existing | Approved by the Governing Body |
| Up to 3 Marlas | 36 | 70 | 21 | 90 |
| 3.01 to 5 Marlas | 60 | 110 | 34 | 160 |
| 5.01 to 10 Marlas | 100 | 300 | 56 | 225 |
| 10.01 to 20 Marlas | 175 | 500 | 100 | 400 |
| Above 20 Marlas | 250 | 1000 | 170 | 680 |

Remarks:

Money exchange rate: 1 US Dollar (USD) = _____ Pakistani rupee (PKR) on April 2015

If no data, answer is "N/D", else if no answer or non-applicable, answer is "N/A".

Questionnaire on the Water Supply Business

Questionnaire 2: Leakage Prevention Work of WASA

1. Organization 組織

1-1. Name of organization for leakage prevention 漏水対策を担当する組織名称

Water and sanitation agency Multan

1-2. Number of person in organization (person) 漏水対策を担当する組織の人員数(人)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/A | 38 | 38 | 38 |

1-3. Annual training time for leakage prevention (person, person x hours)

漏水対策に関する年間研修時間(人×時間)

| | 2013 | 2014 |
|----------------|------|------|
| Person | N/A | N/A |
| Person X Hours | N/A | N/A |

2. Leakage Detection 漏水調査

2-1. Number of leakage survey team (number) 調査チーム数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/A | 9 | 9 | 9 |

2-2. Number of person in one survey team (person) 1チーム当りの人数(人)

4

2-3. Number of days of leakage survey (person x days / year) 年間漏水調査日数(人×日／年)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/A | 4X1 | 4X1 | 4X1 |

2-4. Number of hours of average leakage survey (person x hours / month) 調査平均時間(人×時間／月)

24/hours

2-5. Length of leakage survey (km / year) 年間漏水調査延長(km／年)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/A | N/A | N/A | N/A |

2-6. Number of surface leakage detection (number / year) 年間地上漏水発見数(箇所／年)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 864 | 648 | 576 | 576 |

2-7. Number of underground leakage detection (number / year) 年間地下漏水発見数(箇所／年)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 4320 | 3240 | 2880 | 2880 |

2-8. Breakdown of number of underground leakage detection by Acoustic rod, Leakage detector, Correlative leak detector, and other in 2011 (number)

地下漏水発見数の内訳: 音聴棒、漏水探知機、相関式探知機、その他

| Acoustic rod | Leakage detector | Correlative leak detector | Other |
|--------------|------------------|---------------------------|-------|
| N/A | N/A | N/A | N/A |

2-9. Number of reparation of leakage site (number / year) 年間漏水箇所修理数(箇所)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 5184 | 3888 | 3456 | 3456 |

2-10. Average time to repair from leakage detection and the longest hours (hour)

漏水発見から修理までに要する平均時間(時間)

| Average | Longest |
|---------|---------|
| 24/hour | 48/hour |

2-11. Number of leakage reports from public (number) 市民からの漏水の通報数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| 4665 | 3499 | 3110 | 3110 |

2-12. Have you done Minimum Night Flow Measure method? 夜間最小流量測定を行ったことがあるか?

| |
|-----|
| N/A |
|-----|

3. Equipment of Leakage Detection 漏水調査機材

3-1. Number of Acoustic rod/bar and Amplified acoustic rod (number)

単純アンプ内蔵型/アンプ内蔵型音聴棒の本数(数)

| Acoustic rod/bar | Amplified acoustic rod |
|------------------|------------------------|
| N/A | N/A |

3-2. Number of set of Correlative leak detector (number) 相関式漏水探知機のセット数(数)

| |
|-----|
| N/A |
|-----|

3-3. Number of set of Leak zone detector or Leak noise correlator (number)

音圧式漏水探知機のセット数(数)

| |
|-----|
| N/A |
|-----|

3-4. Number of sensor of Leak zone detector or Leak noise correlator (number)

音圧式漏水探知機のセンサー数(数)

N/A

3-5. Number of Metal pipe locator (number) 金属管探査機の台数(数)

N/A

3-6. Number of Resin pipe locator (number) 樹脂管探査機の台数(数)

N/A

3-7. Number of Distance measuring equipment (number) 距離測定装置の台数(数)

N/A

3-8. Number of Water meter measuring for MNFM (number) 夜間最小流量測定用水量メータの台数(数)

N/A

3-9. Number of vehicles used for leakage survey (number) 漏水対策に用いる車両台数(台)

N/A

3-10. Name of other leakage detector その他の漏水探知機

N/A

4. Water Distribution Analysis 配水量分析

Data in this table is 20 14 . 下表のデータは 20 14 年の水量。

| | | | | | |
|--|--|---|--|---|---|
| System Input Volume 配水量 37.8 MGD | Authorized Consumption 認定使用水 量 30.24 MGD | Revenue Water 有収水量 | Billed Authorized Consumption 請求消費量 | Billed Metered Consumption (including water exported) 検針による料金徴収 | N/A % |
| | | 78% | N/A | Billed Non-metered Consumption 検針に抛らない料金徴収 | N/A % |
| | | Non-Revenue Water (NRW) 無収水量 22% | Unbilled Authorized Consumption 非請求消費量 N/A | Unbilled Metered Consumption 請求せず(検針あり・調停) | N/A % |
| | Water Losses 損失水量 3.78 MGD | | Apparent Losses 商業的(見かけ) 損失量 N/A | Unbilled Non-metered Consumption 請求せず(検針なし・事業用) | N/A % |
| | | | | Unauthorized Consumption 不正規消費(盗水・不明水) | N/A % |
| | | | Real Losses 実質損失量 N/A | Metering Inaccuracies 水道メーター検針エラー | N/A % |
| | | | | Leakage on Transmission and/or Disribution Mains 総配水管からの漏水 | N/A % |
| | | | | | Leakage and Overflows at Utilities Strage Tanks 貯水槽からの溢水、漏水 | N/A % |
| | Leakage on Service Connections up to | N/A % | | | |

| | | | | | |
|--|--|--|--|---------------------------------------|--|
| | | | | Customers' Meters 戸別メータまでの給水管からの漏水 | |
|--|--|--|--|---------------------------------------|--|

4-11. Distributed Water (m³ / year) 年間総配水量(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|----------------------|----------------------|-----------------------|-----------------------|
| 94.97 m ³ | 99.35 m ³ | 104.32 m ³ | 104.32 m ³ |

4-12. Water tariff (Revenue Water) (m³ / year) 水道料金対象水量(有収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/A m ³ | N/A m ³ | N/A m ³ | N/A m ³ |

4-13. Other (Revenue Water) (m³ / year) その他の徴収料金対象水量(有収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/A m ³ | N/A m ³ | N/A m ³ | N/A m ³ |

4-14. Meter loss (Non-Revenue Water) (m³ / year) 水道メータ損失水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/A m ³ | N/A m ³ | N/A m ³ | N/A m ³ |

4-15. Stolen water (Non-Revenue Water) (m³ / year) 盗水損失水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/A m ³ | N/A m ³ | N/A m ³ | N/A m ³ |

4-16. Unpaid water (Non-Revenue Water) (m³ / year) 未納水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/A m ³ | N/A m ³ | N/A m ³ | N/A m ³ |

4-17. Leakage water (Non-Revenue Water) (m³ / year) 漏水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/A m ³ | N/A m ³ | N/A m ³ | N/A m ³ |

4-18. Waterworks usage volume (Non-Revenue Water) (m³ / year) 水道工事使用水量(無収水量)(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/A m ³ | N/A m ³ | N/A m ³ | N/A m ³ |

4-19. Unknown water (Non-Revenue Water) (m³ / year) 不明水量(無収水量) (m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/A m ³ | N/A m ³ | N/A m ³ | N/A m ³ |

4-20. Other (Non-Revenue Water) (m³ / year) その他の無収水量(m³/年)

| 2011 | 2012 | 2013 | 2014 |
|--------------------|--------------------|--------------------|--------------------|
| N/A m ³ | N/A m ³ | N/A m ³ | N/A m ³ |

5. DMA / Leakage Survey Scale DMA/漏水調査メッシュ

5-1. To make up meshes or blocks for leak detection. (If make up meshes or blocks, DMA is replaced with the meshes or blocks.)

漏水調査用のブロックやメッシュを構成しているか(構成している場合は、以下のDMAは読み替える)

| |
|-----|
| N/A |
|-----|

5-2. Number of DMA block (number) DMAブロック数(数)

| |
|-----|
| N/A |
|-----|

5-3. Number of connection in DMA (connection) [Average of all DMA / Minimum / Maximum]

DMA内給水戸数(戸)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/A | Minimum | N/A | Maximum | N/A |
|---------|-----|---------|-----|---------|-----|

5-4. Number of Hourly Factor in DMA [Average of all DMA / Minimum / Maximum]

DMA内時系数(ー)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/A | Minimum | N/A | Maximum | N/A |
|---------|-----|---------|-----|---------|-----|

5-5. Water supply average volume in DMA (m³ / day) [Average of all DMA / Minimum / Maximum]

DMA内日平均給水量(m³)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|--------------------|---------|--------------------|---------|--------------------|
| Average | N/A m ³ | Minimum | N/A m ³ | Maximum | N/A m ³ |
|---------|--------------------|---------|--------------------|---------|--------------------|

5-6. Water supply maximum volume in DMA (m³ / day) [Average of all DMA / Minimum / Maximum]

DMA内日最大給水量(m³)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|--------------------|---------|--------------------|---------|--------------------|
| Average | N/A m ³ | Minimum | N/A m ³ | Maximum | N/A m ³ |
|---------|--------------------|---------|--------------------|---------|--------------------|

5-7. Water pressure in DMA (MPa) [Average of all DMA / Minimum / Maximum]

DMA内給水圧(MPa)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|---------|---------|---------|---------|---------|
| Average | N/A MPa | Minimum | N/A MPa | Maximum | N/A MPa |
|---------|---------|---------|---------|---------|---------|

5-8. Number of valves formed DMA area (number) [Average of all DMA / Minimum / Maximum]

DMAを構成する(区切る)仕切弁数(数)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/A | Minimum | N/A | Maximum | N/A |
|---------|-----|---------|-----|---------|-----|

5-9. Number of valves in DMA (number) [Average of all DMA / Minimum / Maximum]

DMA内仕切弁数(数)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/A | Minimum | N/A | Maximum | N/A |
|---------|-----|---------|-----|---------|-----|

5-10. Number of hydrant in DMA (number) [Average of all DMA / Minimum / Maximum]

DMA内消火栓数(数)[全ブロックの平均/最小/最大]

| | | | | | |
|---------|-----|---------|-----|---------|-----|
| Average | N/A | Minimum | N/A | Maximum | N/A |
|---------|-----|---------|-----|---------|-----|

5-11. Size of mesh (If make up meshes or blocks) (km x km)

漏水調査用メッシュがある場合、メッシュの大きさ(km x km)

| | | |
|--------|---|----|
| N/A km | x | km |
|--------|---|----|

5-12. Number of valve in distribution network (number) 総仕切弁数(数)

| |
|-----|
| N/A |
|-----|

5-13. Number of hydrant in distribution network (number) 総消火栓数(数)

| |
|-----|
| N/A |
|-----|

5-14. Number of another valve in distribution network (number) その他の調整弁等の総数(数)

| |
|-----|
| N/A |
|-----|

5-15. Number of water suspension (number / year) 年間断水回数(数/年)

| |
|-------------------|
| N/A number / year |
|-------------------|

5-16. The total number of connection of water suspension (connection / year) 年間断水のべ戸数(戸/年)

| |
|-----------------------------------|
| 66900 (2014-15) connection / year |
|-----------------------------------|

5-17. Water suspension time per one time (hour / time) [Average / Maximum]

断水1回当たりの継続時間(時間/回)[平均/最大]

| | | | |
|---------|-----------------|---------|-----------------|
| Average | N/A hour / time | Maximum | N/A hour / time |
|---------|-----------------|---------|-----------------|

5-18. Describe the leakage repair flowchart 漏水修繕フロー図の記述

| |
|-----|
| N/A |
|-----|

6. Distribution pipeline laying 管路布設

6-1. New installation pipeline length (km) 新規布設管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D km | N/D km | N/D km |

6-2. Replacement pipeline length (km) 送配水管更新(入替)延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D km | N/D km | N/D km |

6-3. Rehabilitation pipeline length (km) 更生管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D Km | N/D km | N/D km |

6-4. Removal pipeline length (km) 撤去管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D Km | N/D km | N/D km |

6-5. Suspended pipeline length (km) 休止管路延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D Km | N/D km | N/D km |

7. Distribution / Service Pipe material 送配給水管種別

7-1. Ductile Iron Pipe (DIP) length (km) ダクタイル鉄管(DIP)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/A Km | Service | N/A km |
|--------------|--------|---------|--------|

7-2. Cast Iron Pipe (CIP) length (km) 鑄鉄管(CIP)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/D Km | Service | N/D Km |
|--------------|--------|---------|--------|

7-3. Steel Pipe (SP) length (km) 鋼管(SP)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/A Km | Service | N/A Km |
|--------------|--------|---------|--------|

7-4. Stainless Steel Pipe (SUS) length (km) ステンレス鋼管(SUS)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/A Km | Service | N/A km |
|--------------|--------|---------|--------|

7-5. Concrete (Hume) Pipe (HP) length (km) コンクリート管(HP)延長(km)

| | |
|--------------|--------|
| Distribution | N/A Km |
|--------------|--------|

7-6. Asbestos Cement Pipe (ACP) length (km) アスベスト管(ACP)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/D Km | Service | N/D Km |
|--------------|--------|---------|--------|

7-7. Polyvinyl Chloride Pipe (PVC) length (km) 硬質塩化ビニル管(PVC)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/D Km | Service | N/D Km |
|--------------|--------|---------|--------|

7-8. High Impact Vinyl Pipe (HIVP) length (km) 高強度塩化ビニル管(HIVP)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/A Km | Service | N/A km |
|--------------|--------|---------|--------|

7-9. Polyethylene Pipe (PEP) length (km) ポリエチレン管(PEP)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/D Km | Service | N/D Km |
|--------------|--------|---------|--------|

7-10. Galvanized Steel Pipe (GP) length (km) 亜鉛メッキ鋼管(GP)延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/D Km | Service | N/D km |
|--------------|--------|---------|--------|

7-11. Lead Pipe (LP) length (km) 鉛管(LP)の延長(km)

| | | | |
|--------------|--------|---------|--------|
| Distribution | N/A Km | Service | N/A km |
|--------------|--------|---------|--------|

7-12. Copper Pipe (CP) length (km) 銅管(CP)の延長(km)

| | |
|---------|--------|
| Service | N/A km |
|---------|--------|

7-13. Other Pipe length (km) その他の管の延長(km)

| Pipe material name | Distribution | Service |
|--------------------|--------------|---------|
| N/A | km | km |
| N/A | km | km |
| N/A | km | km |
| N/A | km | km |

7-14. Transmission Pipeline length (km) 送水管延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D Km | N/D km | N/D km |

7-15. Distribution Pipeline length (km) 配水管延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D Km | N/D km | N/D km |

7-16. Service Pipeline length (km) 給水管延長(km)

| 2011 | 2012 | 2013 | 2014 |
|--------|--------|--------|--------|
| N/D km | N/D Km | N/D km | N/D km |

8. SCADA/Mapping system 水道情報データ管理／マッピングシステム

8-1. Describe the name of digital data filing 電子データ化している業務名

N/A

8-2. Proportion of filing system of business management document (%) 事業文書の管理割合(%)

| Paper filing | Digital filing |
|--------------|----------------|
| N/A % | N/A % |

8-3. Proportion of filing system of water facilities' drawing (%) 水道工事図面の管理割合(%)

| Paper filing | Digital filing |
|--------------|----------------|
| N/A % | N/A % |

9. Water meter and maintenance 水道メータ・修繕

9-1. Number of installed water meter (number) 水道メータ設置数(数)

| Diameter | 13mm | 20mm | 25mm | mm | mm | Other | Total |
|----------|------|------|------|-----|-----|-------|-------|
| Number | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

9-2. Period of service of water meter (year) 水道メータ使用期間(年)

N/A Year

9-3. Number of annual purchase of water meter (number) 水道メータ年間購入数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/A | N/A | N/A | N/A |

9-4. Times of usage of maintained expiry water meter (times)

満期水道メータの修理後の繰り返し使用回数(回)

N/A

9-5. Number of damaged water meter (number) 破損水道メータ数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/A | N/A | N/A | N/A |

9-6. Number of intentional damaged water meter (number) 故意に破損された水道メータ数(数)

| 2011 | 2012 | 2013 | 2014 |
|------|------|------|------|
| N/A | N/A | N/A | N/A |

9-7. Describe the reason of damaged/broken water meter 水道メータの破損理由の記述

N/A

10. Procurement / Stock management 資材調達・資材管理

10-1. Describe the procedure of procurement of water supply material 材料調達手段の記述

Procurement of water supply material done through open tenders published in newspapers

10-2. Describe the management of spare parts 予備材料の管理方法

The spare parts present in the stores and the concerned sub Eng maintain a stock register

Remarks:

Transmission pipeline defines the pipeline between water treatment plant and distribution reservoir, also between two distribution reservoirs.

DMA defines District Metered Area as same as District Metered Zone (DMZ).

The Hourly Factor defines non-dimension value which hourly maximum consumption volume divides hourly average one.

If no data, answer is "N/D", else if no answer or non-applicable, answer is "N/A".

Pressure unit:

| | MPa | kgf/cm ² | Bar | PSI |
|---------------------|--------|---------------------|--------|-------|
| MPa | 1 | 10.20 | 9.869 | 145.0 |
| kgf/cm ² | 0.0981 | 1 | 0.9678 | 14.22 |
| Bar | 0.1013 | 1.033 | 1 | 14.70 |
| PSI | 0.0069 | 0.0703 | 0.0680 | 1 |

Questionnaire on the Water Supply Business

Questionnaire 3: Tube Well

Name of organization: Water Resources Directorate WASA Multan

Please provide data for tube well as follows:

Q1 How many tube well are there in your town?

Answer: 102

Q2 Do you have the inventory of tube well ?

Answer: Annex- A

If yes, please provide the inventory.

Q3 Do you have information of each tube well regarding well location, installation year, screen depth, maintenance record, operational hours, specification of pumps ?

Answer: Please see below

If yes, please provide these information.

Answer of Q1:

- ❖ Total no of Tube wells in Multan = 102.
 - Installation year = 1985 – 2012
 - Capacity = 4 cusec each
 - Screen depth = 425'
 - Operational hours = 6 to 8 hours.
-
- Detail of Tube wells are attached as Annex A.

Questionnaire on the Water Supply Business

Questionnaire 4: Sewerage and Drainage

Name of organization: WASA Multan

A. Documents or information related to sewerage and drainage system in WASAs

(1) Please provide following maps.

Attached at the End

- Location Plan of the City (including Area Boundary) Annex-B
- Topography and Levels N/D
- Served and Unserved Areas N/D
- WASA administration Zones Boundary Annex-C
- Location of Disposal stations Annex -D
- Layout Plan of Existing Sewer System Annex- E
- Layout Plan of Existing Drainage System N/D
- Existing Drainage Route and Point of Final Disposal Annex- F
- Proposed or planed Sewers and Drainages System N/D
- Major Ponding Areas N/D

(2) Please provide following rainfall data.

- Rainfall intensity (15, 30, 60 120 minutes, 3,6,9,12 hours duration)

| | |
|-------------------|-----------|
| 03 September 1976 | 134.2 mm |
| 24 July 1978 | 114.30 mm |
| 19 Aug 1992 | 127 mm |
| 06 July 2010 | 92 mm |

- Fitted Intensity Duration Curve (N/A)

B. Organization and finance

(1) Please provide an actual organization chart of WASAs especially Sewers and Drainages cleaning (Engineers, Equipment operators, Sewer man, etc)

Annex-G

- ❖ Attached at the end (Organization Chart of Wasa of sewers and drainages)

(2) Please furnish an annual budget and disbursement in the WASAs and its breakdown for the last 5 years especially Sewers and Drainages cleanings.

Attached as Annex-H

C. Equipment/Machinery

[illegible][illegible]

| | | | | | | | |
|--------------|-----------------|------|--------------------|--------------|--------------|---------------------|-------|
| entent | dean ancient | each | an act of honor | inn honor | inn honor | aintenance ethic | catch |
| heer xcat | | | ats a an | h | nde e a | Need e ha | t |

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ced the machine maintenance and process data/time maintenance act and
e a at n act f s ec d/e t

Attached as Annex- ☐

assessments as essential techniques and constructive

Don't have an answer ☐ N/A ☐

_____ A e a e e d _____ n h _____ s e d a _____ e e s and D a n a e s c e a n n s

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e head e c tt n a f channe e sh fa e etc

N/A

Questionnaire on the Water Supply Business

Questionnaire 5-Multan

Management, Finance and Organization

Name of organization: Multan WASA

Management

Please answer the questions and provide demand details in recent three years
current facilities and organization chart in charted answers

| | Questions | Please provide answers | Reference document |
|-----------------|---|--|--------------------|
| System state | Existence of Institution-Plan | Answers Comments Attached as Annex- | AA aste an |
| Finance | Revenues | Water supply Water supply Water supply Water supply Water supply Water supply | Attached Annex- |
| | Costs | Water supply Water supply Water supply Water supply Water supply Water supply | Attached Annex- |
| | Investment | Water supply Water supply Water supply Water supply Water supply Water supply | |
| | Annual Finance sources | What is annual finance source Characteristic of the financial management - Mass stance Answer the water supply characteristics - General finance | |
| Other expansion | What is the expansion plan Necessary treatment plant | | |

| | |
|---|---------|
| unmetered connection | |
| Water sold industrial unmetered connection | 413 |
| Free water supply | 1810274 |
| Total water sold | 0 |
| Water residential connections metered (with operating meters) | 0 |
| Water commercial connections metered (with operating meters) | 0 |
| Water industrial connections metered (with operating meters) | 0 |
| Water residential connections metered | 0 |
| Water commercial connections metered | 0 |
| Water industrial connections metered | 0 |
| Water residential connections unmetered | 44839 |
| Water commercial connections unmetered | 1960 |
| Water industrial connections unmetered | 3 |
| Length of water supply network | 1280 |
| Number of breakages in water supply network | 66 |
| Number of leakages in water supply network | 500 |
| Staff related to water supply services | 202 |
| Length of sewer network | 1204 |
| Length of sewer network cleaned | 127 |

| | |
|---|----------|
| No of manholes | 26488 |
| No of manholes covered/replaced | 522 |
| No of manholes cleaned/debilitated | 2940 |
| No of sewer blockage | 2945 |
| No of crown failures/collapses | 21 |
| Length of storm water drainage network | 0 |
| Length of storm water drainage network used as a sludge carrier | 0 |
| Sewer residential connections | 118176 |
| Sewer commercial connections | 10373 |
| Sewer industrial connections | 66 |
| Waste water treated at primary level | 0 |
| Waste water treated at secondary level | 0 |
| Waste water collected | 22380589 |
| Staff related to sewerage services | 743 |
| Capacity of all sewerage plants | 0 |

| | |
|---|----------|
| Waste water generated | 22380589 |
| No of samples at source | 29 |
| Chemically unfit samples at source | 0 |
| Biologically unfit samples at source | 0 |
| No of samples at taps | 13 |
| Chemically unfit samples at taps | 0 |
| Biologically unfit samples at taps | 0 |
| Total no of residual chlorine samples carried out | 0 |
| Total no of residual chlorine samples carried out as per standards | 0 |
| Total no of residual chlorine samples that passed the relevant standard | 0 |
| Complaints related to water supply services | 496 |
| Complaints related to sewerage services | 3128 |
| Complaints related to bill collection | 1165 |
| Total revenue from water supply services | 8560000 |
| Total revenue from waste water services | 3280000 |

| | |
|---|-----------------|
| Total revenue from other sources | 16217000 |
| Salaries/employee related cost | 58549000 |
| Maintenance cost (without contracted out cost) | 1180000 |
| Debt servicing cost | 0 |
| Power/electricity cost | 5490000 |
| Contracted out cost (for maintenance only) | 0 |
| Depreciation cost | 0 |
| Other cost | 0 |
| Investment generated from own sources revenue | 11453847 |
| Arrears | 0 |
| Total no of bills issued | 304439 |
| Total no of bills paid | 94684 |
| Total amount of bill issued | 53531025 |
| Total amount of bill recieved | 32867619 |

Current Events Multifan

[illegible]

| | | | | |
|--------------------------------|--|--------------|---|--------|
| ateete nsta at n at | | N/A | A | N/A |
| Aeae nth ta | | s | A | s |
| eenec ect n at | | N/A | A | N/A |
| Ne c nnect n nsta at n ee | | + s | A | + s |
| Ann a c sts e a c nnect n s | | s | A | s |
| Ann a a nts | | c a nts a | A | f a |

ea e

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|----------------------------|----------------|-----|-----------------------------|
| eae th se ae | | A | |
| eae ca ac f /da | | N/A | n /da |
| Act a ae ae se ae e /da | | N/A | N/A |
| eae net en th | | A | |
| D ana e net en th | | A | ne th se ae |
| D ana e stat ns | tas ns nte | A | stat ns nte |
| eae t eat ent a nts | nde c nst ct n | A | ant |

List of Annexures

Multan

| | |
|------------|---|
| Annexure A | Questionnaire3, Question 2-3 Details of Tube Wells |
| Annexure B | Questionnaire 4 (A-1) MAP, Location Plan of City including area boundry |
| Annexure C | Questionnaire 4 (A-1) MAP, WASA Administration Zone Boundary |
| Annexure D | Questionnaire 4 (A-1) MAP, Location of Disposal Stations |
| Annexure E | Questionnaire 4 (A-1) MAP, Layout Plan of existing sewer system |
| Annexure F | Questionnaire 4 (A-1) MAP, Final Disposal, Sewerage Central & South Zone Questionnaire 4 (A-1) MAP, Outfall Arrangements North Zone |
| Annexure G | Questionnaire 5 - 1 Number of Staff in Each Division Questionnaire 4 (B-1) Organogram, Sewerage Division South Questionnaire 4 (B-1) Organogram, Sewerage Division North Questionnaire 5 - 1 Organogram, Directorate |
| Annexure H | Questionnaire 4 (B-2) Budget |

| | |
|------------|--|
| Annexure I | Questionnaire 4 (C-1) List of Machinery |
| Annexure J | Questionnaire 4 (C-3) Vehicle Repair Procedure |
| Annexure K | Questionnaire 5-1 Revenue & Costs |
| Annexure L | Questionnaire 5 - 1 Administrative Approval Master Planning WASA Multan |

DETAIL OF WASA (MDA) TUBE WELLS

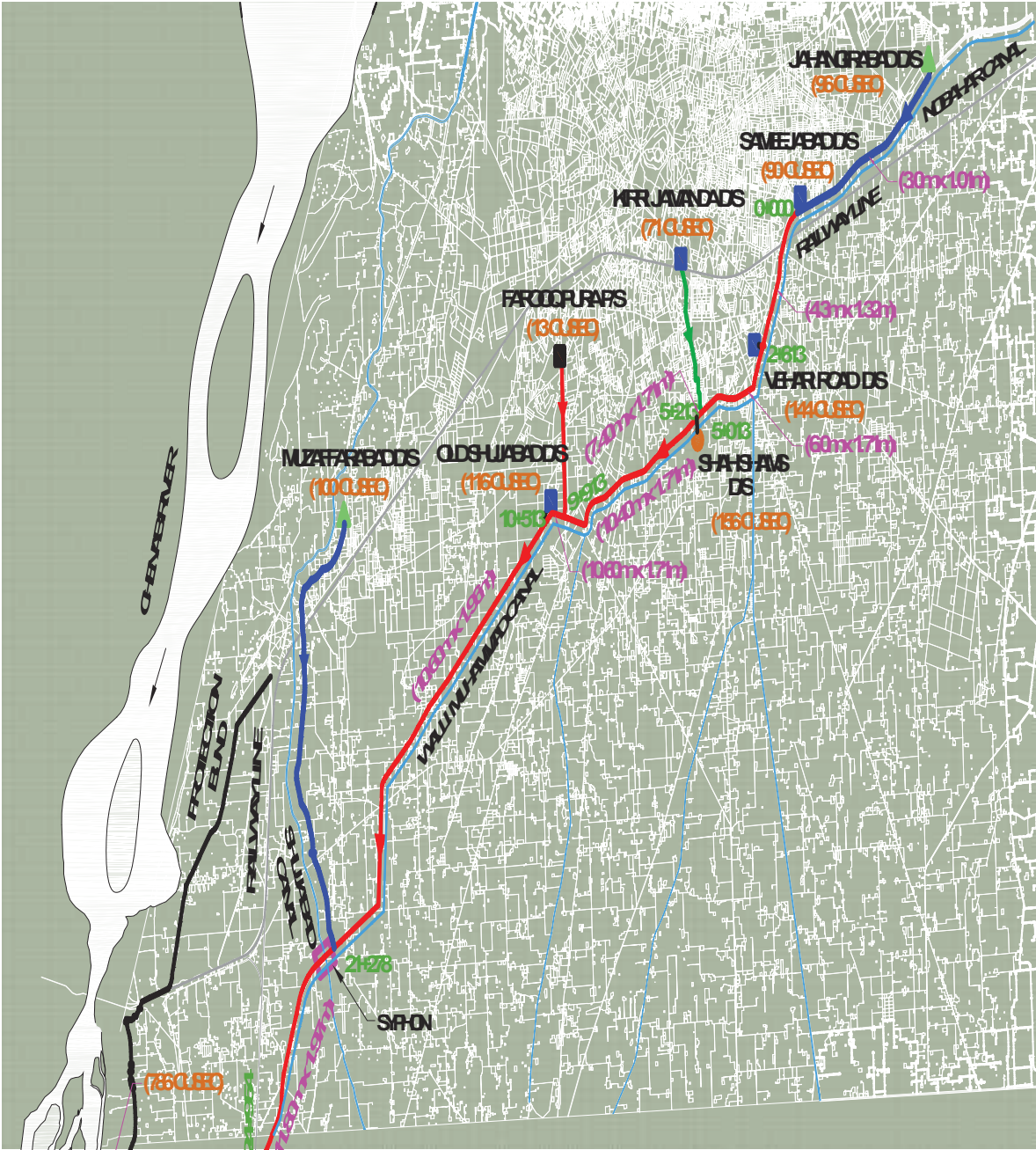
| Sl. No. | Location | Year of Installation | Pump over | | Motor | Bore Flow Meter | Pump | | Well Depth | Pump Setting | Status |
|---------|----------------------------------|----------------------|-----------|------------------|-------|-----------------|-----------------|--------|------------|--------------|------------|
| | | | Make | Rated Power (HP) | | | Rated Discharge | Design | | | |
| 1 | Daman Road | 2012 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 2 | Gulshan office-I | 2009 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 3 | Gulshan office-II (PM Package) | 2012 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 4 | Dhob Ghata-I | 1964 | Siemens | 100 | KSB | YES | 4 | 2 | 115 | 100 | Functional |
| 5 | Dhob Ghata-II (PM Package) | 2012 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 100 | Functional |
| 6 | Ladhi colony-I | 1985 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 100 | Functional |
| 7 | Ladhi Colony-II (PM Package) | 2012 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 100 | Functional |
| 8 | Nawab Pur road | 2017 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 9 | Nagaband colony | 2008 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 10 | Circuit House | 1951 | Siemens | 100 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 11 | Bagh Langay Khan-I | 1968 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 12 | Bagh Langay Khan-II (PM Package) | 2012 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 13 | MDA Chowk-I | 1981 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 14 | MDA Chowk-II | 2007 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 15 | Nawab Shaher-I | 1996 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 16 | Nawab Shaher-II | 2009 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 17 | Lohari Gate-I | 2008 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 18 | Lohari Gate-II | 1997 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 19 | Lohari Gate-III | 2009 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 20 | Lohari Gate-IV (PM Package) | 2012 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 21 | Eid Gah-I | 1996 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 22 | Eid Gah-II | 2009 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 23 | Eid Gah-III (PM Package) | 2012 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 24 | Tibi Sher Khan (PM Package) | 2011 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 25 | Hunayn Road | 1990 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 26 | Shamshabad (PM Package) | 2011 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 27 | Rashidabad | 2000 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 28 | Mumtazabad Park | 2000 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 29 | Mumtazabad-I | 2000 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |

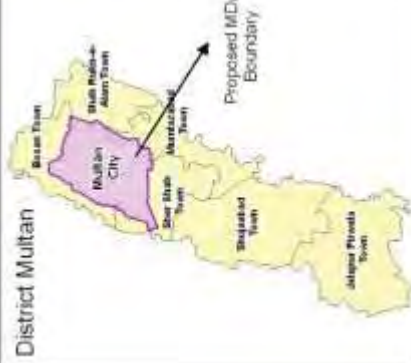
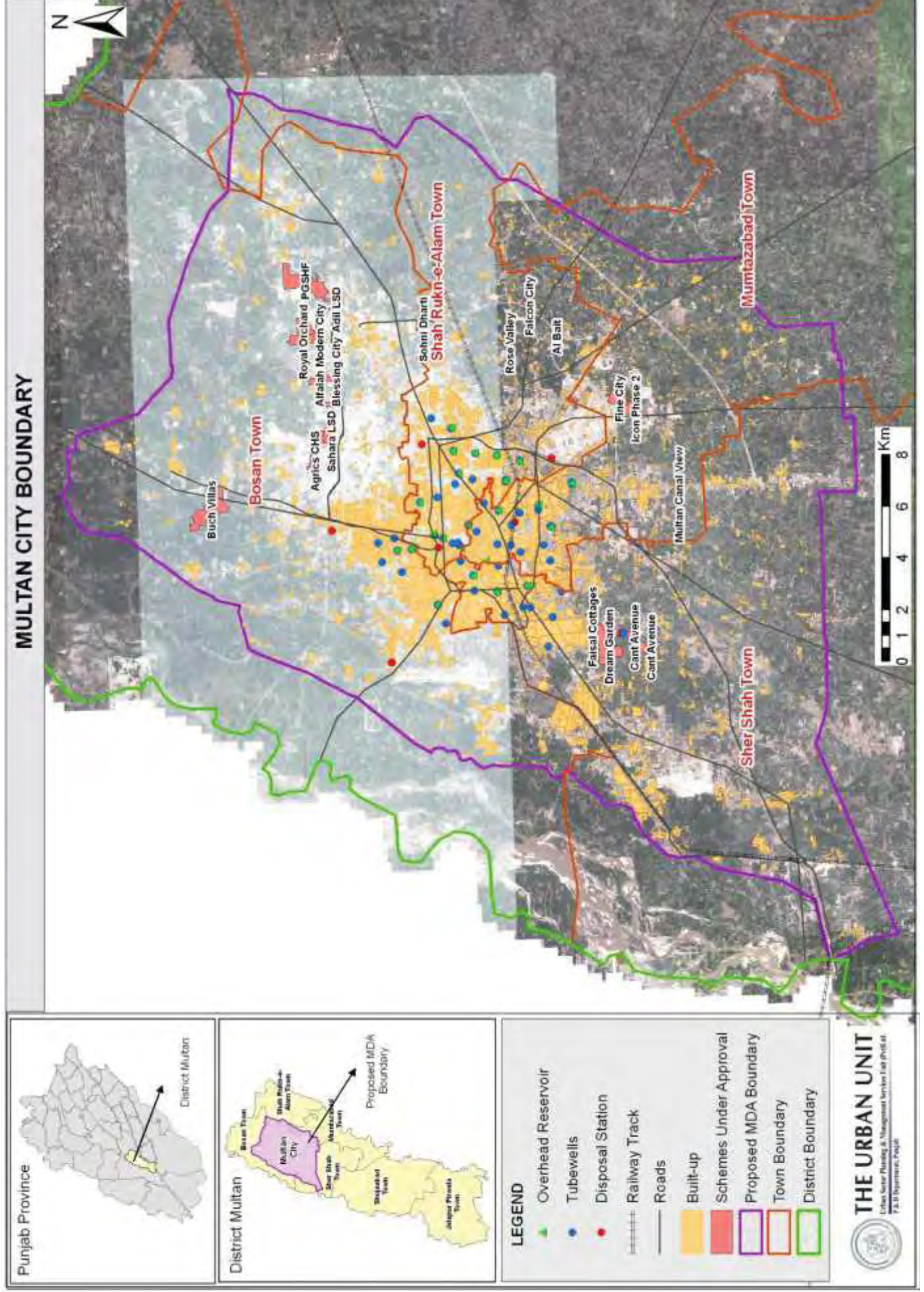
| | | | | | | | | | | | |
|----|---------------------------------|------|---------|-----|-----|-----|---|---|-----|-----|------------|
| 30 | Mumtazabad-II | 2001 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 31 | Gujar Plot | 1981 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 32 | B.C.G Chowk (PM Package) | 2012 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 33 | Aam Khas Bagh-I | 2007 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 34 | Aam Khas Bagh-II | 2007 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 35 | Aam Khas Bagh-III (PM Package) | 2011 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 36 | Samajabad | 1990 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 37 | Gulshan Market-I | 2001 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 38 | Gulshan Market-II (PM Package) | 2011 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 39 | G. Ghata SRA-I | 2007 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 40 | G. Ghata SRA-II (PM Package) | 2011 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 41 | D. Ghata SRA-I | 2007 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 42 | D. Ghata SRA-II | 2007 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 43 | M. Ghata SRA-I | 2007 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 44 | M. Ghata SRA-II (PM Package) | 2011 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 45 | Qasim Pur colony-I | 2007 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 46 | Qasim Pur colony-II | 1990 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 47 | Rugby Town-I | 1980 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 48 | Rugby Town-II (PM Package) | 2011 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 49 | Anwar Colony-I | 2001 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 50 | Anwar Colony-II | 2001 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 51 | Samanaabad | 1994 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 52 | Gulberg Colony | 1990 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 53 | Bagh-e-Mirza Jan | 2007 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 54 | Wileyabad-I | 1981 | Siemens | 150 | KSB | YES | 4 | 2 | 425 | 101 | Functional |
| 55 | Wileyabad-II | 1981 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 56 | Hassan Parwana-I | 1981 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 57 | Hassan Parwana-II | 2001 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 58 | Hassan Parwana-III | 2001 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 59 | A-Sana Hotel | 2001 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 60 | Chowk Shahjahan-I | 2001 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 61 | Chowk Shahjahan-II (PM Package) | 2011 | Siemens | 150 | KSB | NO | 4 | 4 | 425 | 101 | Functional |
| 62 | Purana Bui Khana | 1981 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 63 | A-Khosh | 2001 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |
| 64 | Khan Pur | 1981 | Siemens | 150 | KSB | YES | 4 | 4 | 425 | 101 | Functional |

| | | | | | | | | | | | |
|----|---|------|------|-----|-----|-----|---|---|-----|-----|------------|
| 65 | Grass Mandi | 1997 | Slum | 150 | KSD | YES | 4 | 4 | 421 | 100 | Functional |
| 66 | Siddique Abad | 1999 | Slum | 150 | KSD | YES | 4 | 4 | 422 | 100 | Functional |
| 67 | Toya Kari Wala | | Slum | 150 | KSD | YES | 4 | 4 | 423 | 100 | Functional |
| 68 | Kirti Jemadar | | Slum | 150 | KSD | YES | 4 | 4 | 424 | 100 | Functional |
| 69 | W-Block New Mutan-I | 2000 | Slum | 150 | KSD | YES | 4 | 4 | 425 | 100 | Functional |
| 70 | W-Block New Mutan-II (PM Package) | 2000 | Slum | 150 | KSD | YES | 4 | 4 | 426 | 100 | Functional |
| 71 | K-Block SRA-I | 2000 | Slum | 150 | KSD | YES | 4 | 4 | 427 | 100 | Functional |
| 72 | K-Block SRA-II (PM Package) | 2000 | Slum | 150 | KSD | NO | 4 | 4 | 428 | 100 | Functional |
| 73 | Le-Cat Camp | 2000 | Slum | 150 | KSD | YES | 4 | 4 | 429 | 100 | Functional |
| 74 | Pr Zahid Shah-I (Phase-VI) | 2000 | Slum | 150 | KSD | NO | 4 | 4 | 430 | 100 | Functional |
| 75 | Pr Zahid Shah-II (Phase-VI) | 2000 | Slum | 150 | KSD | NO | 4 | 4 | 431 | 100 | Functional |
| 76 | Basti Town (Phase-VI) | 2000 | Slum | 150 | KSD | NO | 4 | 4 | 432 | 100 | Functional |
| 77 | Shahpur Colony (Phase-VI) | 2002 | Slum | 150 | KSD | NO | 4 | 4 | 433 | 100 | Functional |
| 78 | Mooli Town (Phase-VI) | 2002 | Slum | 150 | KSD | NO | 4 | 4 | 434 | 100 | Functional |
| 79 | Siti Khana (PM Package) | 2002 | Slum | 150 | KSD | NO | 4 | 4 | 435 | 100 | Functional |
| 80 | E-Block SRA (Phase-VI) | 2003 | Slum | 150 | KSD | YES | 4 | 4 | 436 | 100 | Functional |
| 81 | Niaz Town (Phase-VI) | 2003 | Slum | 150 | KSD | YES | 4 | 4 | 437 | 100 | Functional |
| 82 | Chair Mani Forest Pura (Phase-VI) | 2003 | Slum | 150 | KSD | YES | 4 | 4 | 438 | 100 | Functional |
| 83 | Raza Abad Full Phased Colony (Phase-VI) | 2007 | Slum | 150 | KSD | YES | 4 | 4 | 439 | 100 | Functional |
| 84 | Mazafarabad (Phase-VI) | 2001 | Slum | 150 | KSD | YES | 4 | 4 | 440 | 100 | Functional |
| 85 | Bast Khudadas (Phase-VI) | 2001 | Slum | 150 | KSD | YES | 4 | 4 | 441 | 100 | Functional |
| 86 | Hassan Abad (Phase-VI) | 2001 | Slum | 150 | KSD | YES | 4 | 4 | 442 | 100 | Functional |
| 87 | Mushaq Colony (Phase-VI) | 2002 | Slum | 150 | KSD | YES | 4 | 4 | 443 | 100 | Functional |
| 88 | New Shah Shamas Colony | 2006 | Slum | 150 | KSD | YES | 4 | 4 | 444 | 100 | Functional |
| 89 | New Shah Shamas Colony (PM Package) | 2007 | Slum | 150 | KSD | NO | 4 | 4 | 445 | 100 | Functional |
| 90 | Chauk Pura (Phase-VI) | 2002 | Slum | 150 | KSD | YES | 4 | 4 | 446 | 100 | Functional |
| 91 | Shah Shamas Park (PM Package) | 2003 | Slum | 150 | KSD | YES | 4 | 4 | 447 | 100 | Functional |
| 92 | Kulshrestha Mandi | 2007 | Slum | 150 | KSD | YES | 4 | 4 | 448 | 100 | Functional |

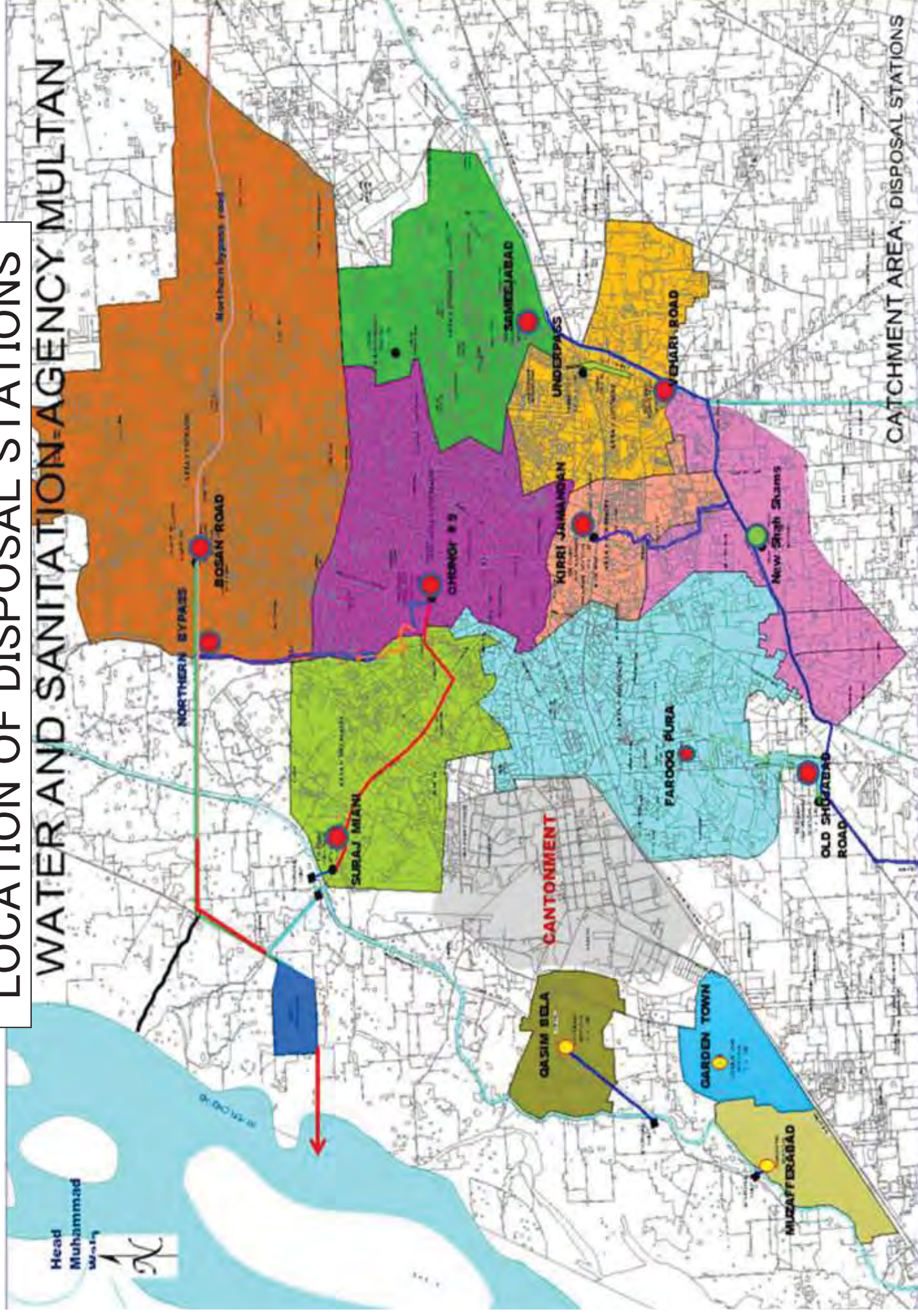
| | | | | | | | | | | | |
|-----|---------------------------------------|------|------|-----|-----|-----|---|---|-----|-----|------------|
| 93 | Gulgasht Board office-I | 2002 | Slum | 150 | KSD | YES | 4 | 4 | 449 | 100 | Functional |
| 94 | Gulgasht Board office-II (PM Package) | 2002 | Slum | 150 | KSD | YES | 4 | 4 | 450 | 100 | Functional |
| 95 | Khan Village (PM Package) | 2002 | Slum | 150 | KSD | YES | 4 | 4 | 451 | 100 | Functional |
| 96 | Timber Market (PM Package) | 2002 | Slum | 150 | KSD | YES | 4 | 4 | 452 | 100 | Functional |
| 97 | Timber Market (PM Package) | 2002 | Slum | 150 | KSD | YES | 4 | 4 | 453 | 100 | Functional |
| 98 | TB Hospital-I | 2000 | Slum | 150 | KSD | YES | 4 | 4 | 454 | 100 | Functional |
| 99 | TB Hospital-II (PM Package) | 2001 | Slum | 150 | KSD | YES | 4 | 4 | 455 | 100 | Functional |
| 100 | Muslim Colony | 1990 | Slum | 150 | KSD | YES | 4 | 4 | 456 | 100 | Functional |
| 101 | Muslim Colony-I (PM Package) | 2002 | Slum | 150 | KSD | YES | 4 | 4 | 457 | 100 | Functional |
| 102 | | 2002 | Slum | 150 | KSD | YES | 4 | 4 | 458 | 100 | Functional |

□ □ ati □ n □ □ an □ □ the □ City

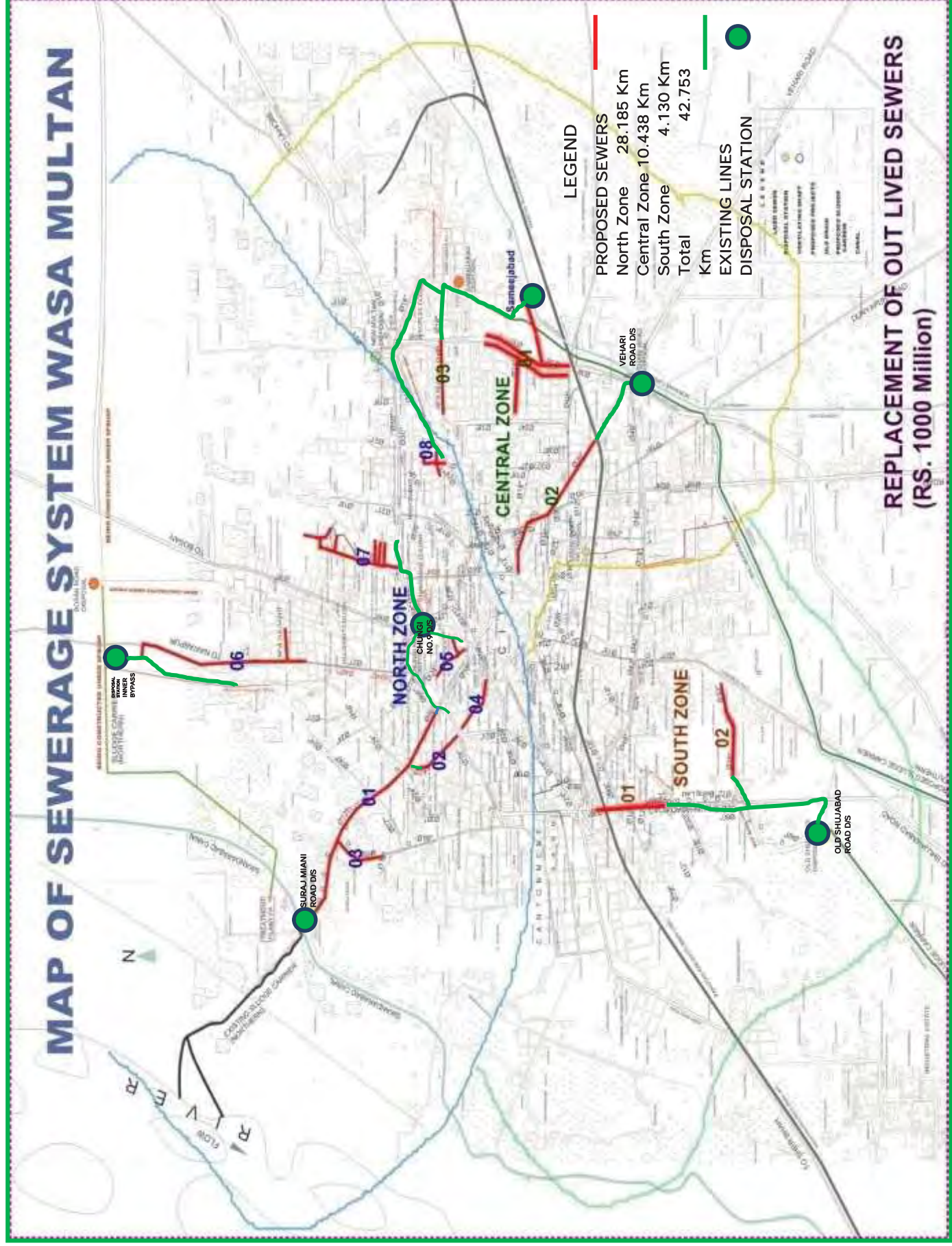




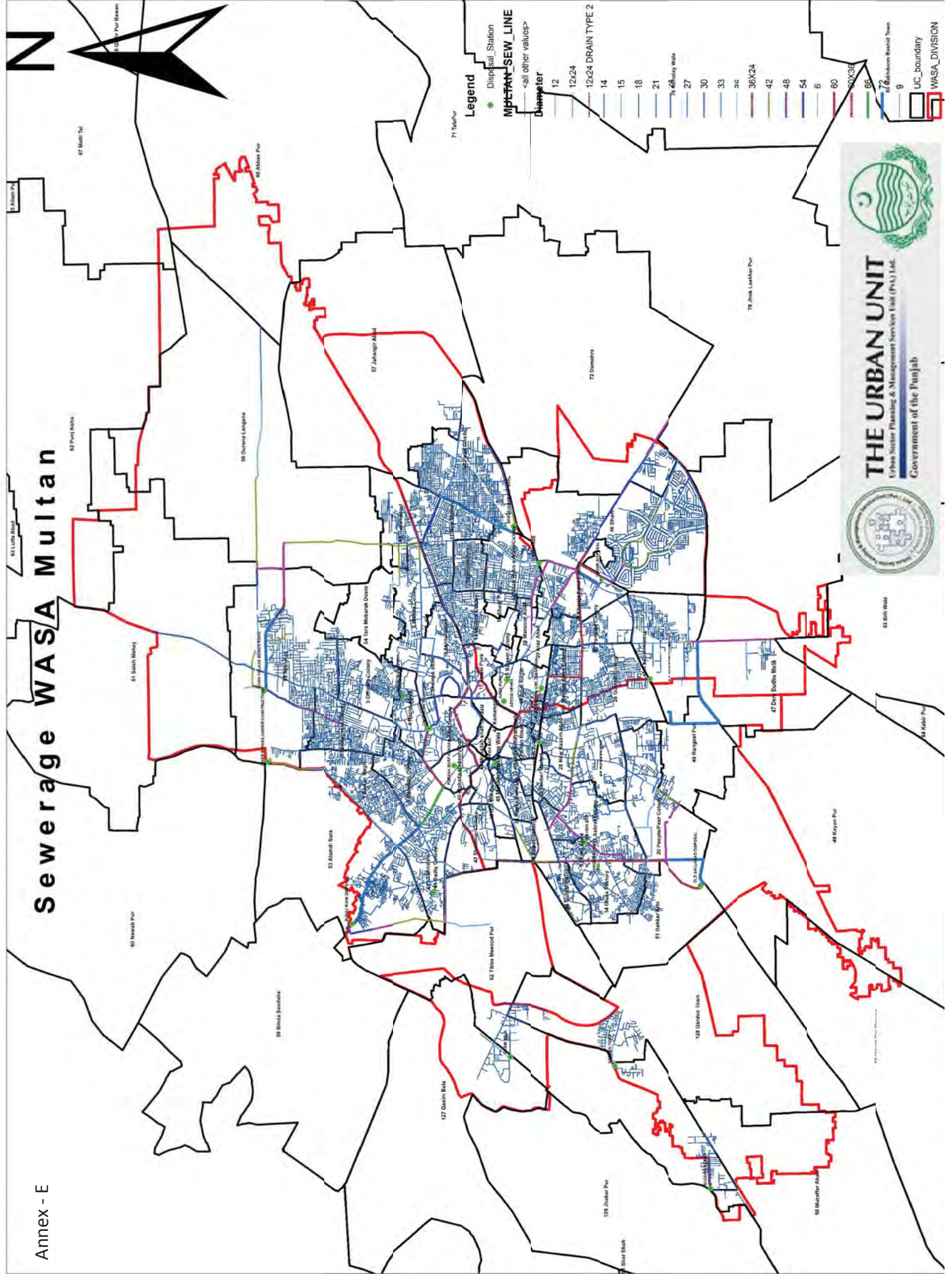
LOCATION OF DISPOSAL STATIONS



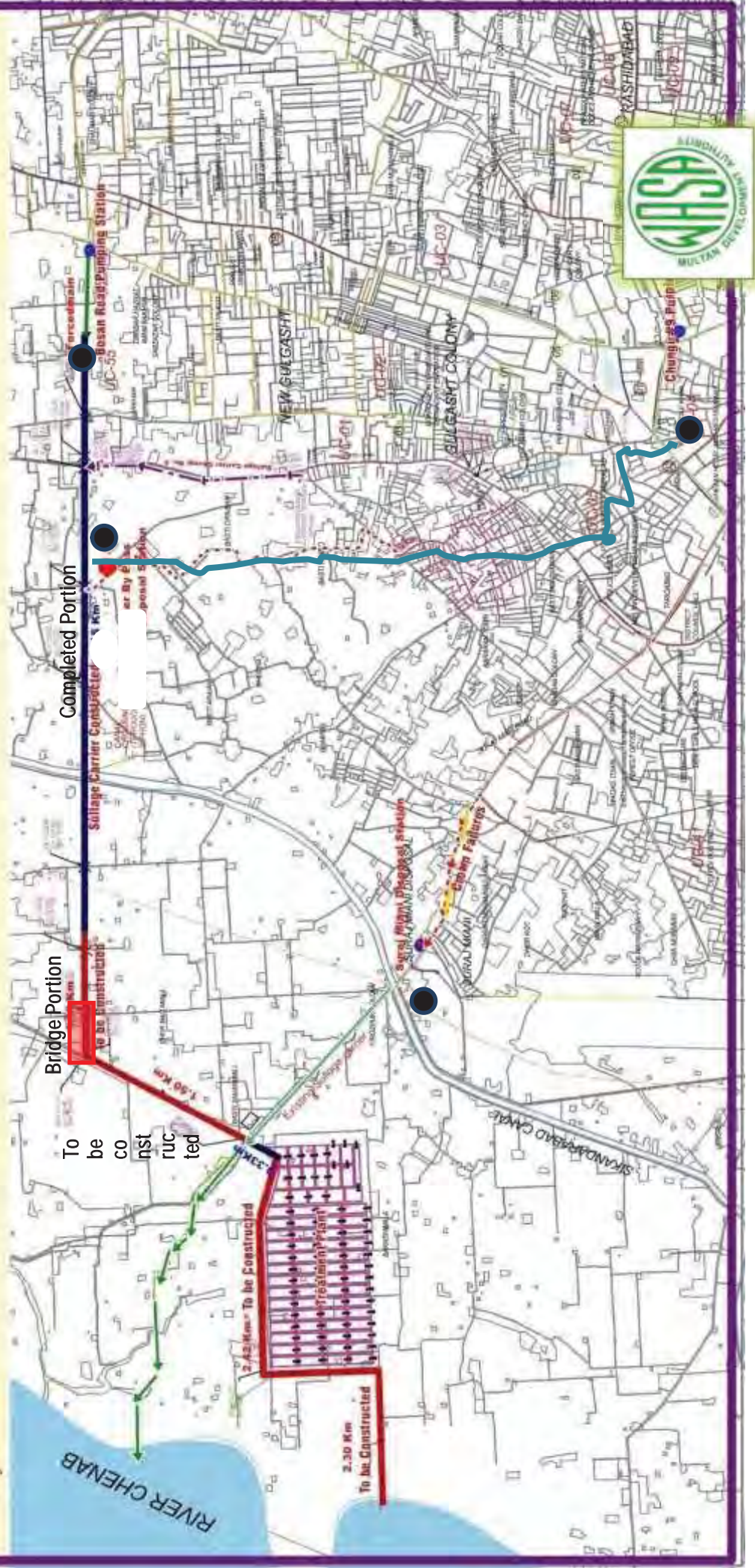
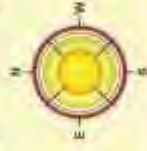
| S. # | NAME OF DISPOSAL | Pumps / Cusecs | | | | | | | | | | | | Total Area | Covered Area | establlished year | Total capacity | Maker of pumps | Discharge point | |
|------|--------------------------------------|----------------|----|----|----|---|---|---|---|---|---|-----|-------------|------------|--------------|-------------------|----------------|----------------|-------------------------------------|------------------------------------|
| | | 20 | 15 | 12 | 10 | 8 | 5 | 4 | 3 | 2 | 1 | 0.5 | Total Pumps | | | | | | | Operational | Non Operational |
| 1 | Chungi # 9 (Old) | 5 | - | 1 | - | - | - | - | - | - | - | 6 | 4 | 2 | 5.1 K | 8242.6 Sft | 1983-84 | 164-CFS | KSB-vertical non-clogging | suraj miani |
| 2 | Chungi # 9 (New) | - | - | 1 | 3 | - | 2 | - | - | - | - | 6 | 4 | - | 24 K | 11200 Sft | 2007-08 | | KSB | suraj maini |
| 3 | Old Shujabad Road | - | 6 | - | - | - | - | - | - | - | - | 6 | 5 | 1 | 7.15 K | 11973 Sft | 1983-84 | 90 | KSB | hamid pur minor |
| 4 | Farooq Pura D/S | - | - | - | - | 2 | - | - | 2 | - | - | 4 | 3 | 1 | 13.0 K | 6969 Sft | 2004-05 | 20 | KSB | old shujah bad road |
| 5 | Kirri Jamandan Old | - | 3 | - | - | - | - | - | - | - | - | 3 | 2 | 1 | 19.8 K | 6313 Sft | 1983-84 | 115 | KSB & GRUND FOSE | hamid pur minor |
| 6 | Kirri Jamandan New | - | 2 | - | 2 | - | 2 | - | - | - | - | 6 | 4 | 2 | 23.85 K | 6304.50 Sft | 2007-08 | | | vehari road sewer line |
| 7 | Sameejabad | 2 | 3 | - | 1 | - | 1 | - | - | - | - | 7 | 6 | 1 | 7.32 K | - | 2007-09 | 100 | KSB | head nau bahar |
| 8 | Bosan Road | 4 | 6 | - | - | - | - | - | - | - | - | 10 | 6 | 4 | | | 2007-09 | | | |
| 9 | Suraj Milani D/S | - | 9 | - | - | - | - | - | - | - | - | 9 | 7 | 2 | 86.16 K | 9707.47 Sft | 1980-81 | 135 | KSB-vertical non-clogg: & Grundfose | chanab river |
| 10 | Vehari Road | - | 9 | - | - | - | - | - | - | - | - | 9 | 8 | 1 | 18 K | 6235 Sft | 1983-84 | 135 | KSB & GRUND FOSE | nau bahar canal |
| 11 | Advog Vehara L/S | - | - | - | - | - | - | - | - | 1 | 1 | 2 | 1 | 1 | 6.5 K | 1028 Sft | | 2 | | manzorabad main trunk line |
| 12 | Farid Abad L/S | - | - | - | - | - | - | - | 1 | 1 | - | 1 | 1 | - | 1.55 K | 592 Sft | | 2 | KSB | main trunk sewer line |
| 13 | Agha Pura L/S | - | - | - | - | - | - | - | - | 2 | - | 2 | 1 | - | 0.35 K | 173 Sft | | 2 | FECO & KSB | dehli gate sewer line |
| 14 | Wahid Abad L/S | - | - | - | - | - | - | 1 | 2 | - | - | 3 | 3 | - | 1.8 K | 1833 Sft | | 8 | KSB | bhud pur road |
| 15 | Madina Colony L/S | - | - | - | - | - | - | 1 | 1 | 1 | - | 3 | 2 | 1 | 0.9 K | 453 Sft | | 5 | KSB | chowk shahbaz main trunk line |
| 16 | Garden Town | - | - | 2 | - | 2 | - | - | - | - | - | 4 | 4 | - | 2.1 K | 3445 Sft | 2007-08 | 30 | KSB | use for arigation in army area |
| 17 | Nala Wali Muhammad (New Shah Shamas) | - | - | - | - | - | 5 | - | - | - | - | 5 | 5 | - | 63.55 K | | | 24 | KSB | use for broad arigation |
| 18 | Under Pass | - | - | - | - | - | - | - | - | 3 | - | 3 | 3 | - | 0.65 | 1684 Sft | 2004-05 | 3 | KSB | |
| 19 | Toya Taqi Shah | - | - | - | - | - | - | - | 2 | - | - | 2 | 1 | 1 | 0.5 K | 297 Sft | 2004-05 | 4 | KSB | main eid ghah trunk line |
| 20 | Kotla Waris Shah | - | - | - | - | - | - | - | - | 1 | - | 1 | 1 | - | 0.185 K | 1070.92Sft | 2004-05 | 1 | KSB | suraj miani trunk line |
| 21 | Purana Burf Khan | - | - | - | - | - | - | - | - | 1 | - | 1 | 1 | - | 0.72 K | 644 Sft | 1980-81 | 1 | KSB | katchery road sewer line |
| 22 | Qadeerabad | - | - | - | - | - | - | - | - | 1 | 1 | 2 | 2 | - | 1.05 K | 5722.42 Sft | 1980-81 | 3 | KSB | chowk fawara sewer line |
| 24 | Qasim Bela | - | - | - | 2 | - | 2 | - | - | - | - | 4 | 4 | - | 5.5 K | 3359 Sft | 2007-08 | 30 | KSB & GRUND FOSE | shujah bad canal & broad arigation |

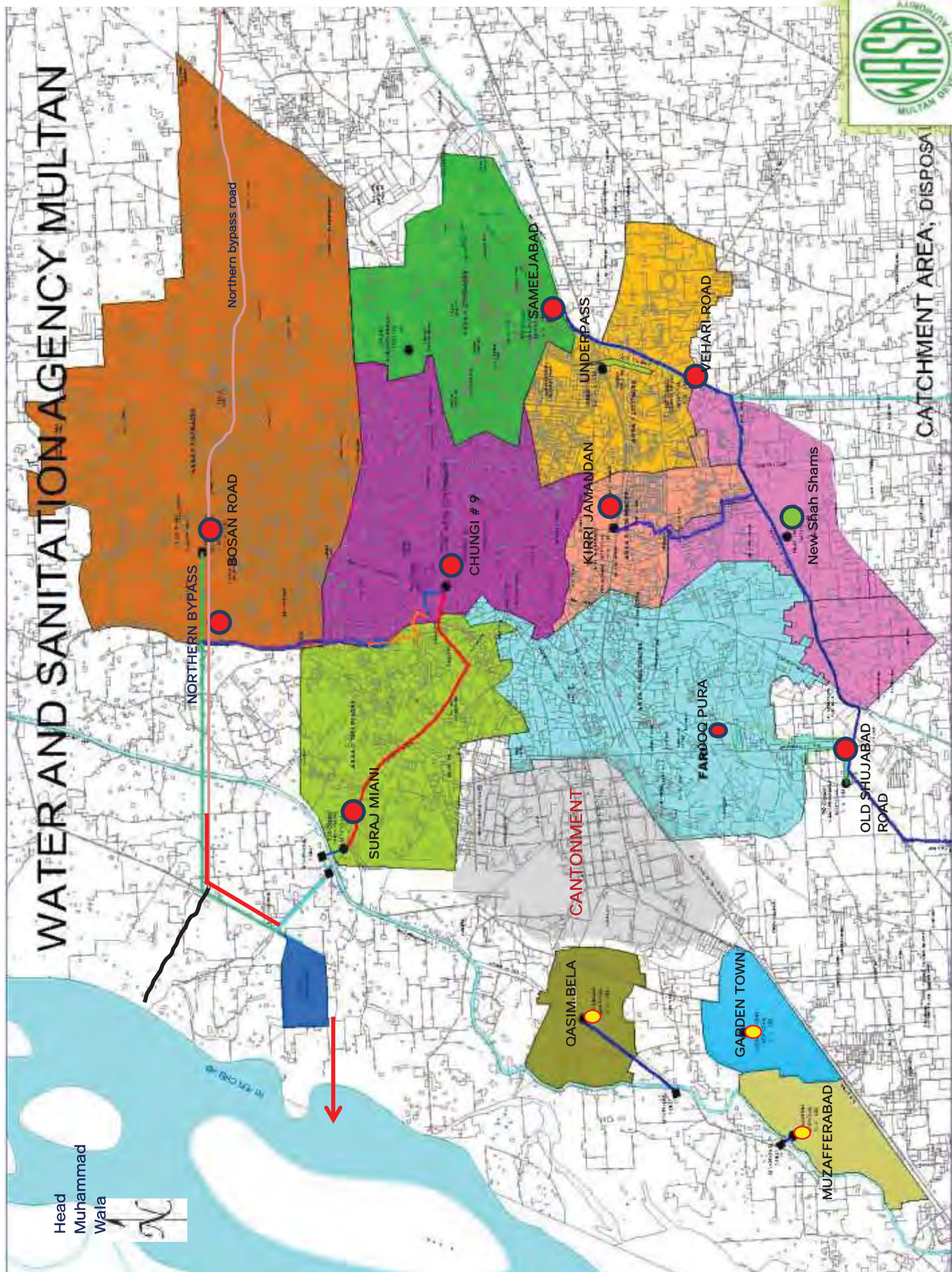


Sewerage WASA Multan



Outfall Arrangements North Zone WASA





FINAL DISPOSAL OF SEWAGE CENTRAL & SOUTH ZONES



WWTP

LEGEND

EXISTING DISPOSAL STATION

UNDER CONSTRUCTION D/S

PROPOSED DISPOSAL

| | |
|---------------------------------|---------------------|
| Length | 35Km |
| Section (m) | 3 x 1.01 - 12.20 |
| Max: Discharge Capacity | 786 Cusecs |
| Treatment Plant Design Velocity | 0.89 m/sec |
| Treatment Option | Waste Stabilization |
| Ponds | |
| Land Requirement | 785 Acres |
| Design Temperature | 21.80 C° |
| Treatment capacity | 113 MGD |
| BOOD Reduction | 250mg/l to < 80mg/l |

Number of staff in each division by grade

STAFF STRENGTH WASA MULTAN AS ON 14-09-2015

| Sr.# | BPS | No. Of Sanctioned Posts | On Roll | Vacant |
|--------------|----------------------------|-------------------------|-------------|------------|
| 1. | 20 | 01 | - | 01 |
| 2. | 19/20 | 01 | 01 | - |
| 3. | 19 | 05 | 01 | 04 |
| 4. | 18 | 12 | 11 | 01 |
| 5. | 17 | 29 | 25 | 04 |
| 6. | 16 | 17 | 11 | 06 |
| 7. | 15 | 10 | 04 | 06 |
| 8. | 14 | 14 | 13 | 01 |
| 9. | 13 | 12 | 04 | 08 |
| 10. | 12 | 06 | 05 | 01 |
| 11. | 11 | 68 | 47 | 21 |
| 12. | 10 | 01 | 01 | - |
| 13. | 09 | 23 | 21 | 02 |
| 14. | 08 | 03 | 01 | 02 |
| 15. | 07 | 118 | 86 | 32 |
| 16. | 06 | 39 | 32 | 07 |
| 17. | 05 | 82 | 66 | 16 |
| 18. | 04/06 | 143 | 143 | - |
| 19. | 03 | 06 | 01 | 05 |
| 20. | 02 | 24 | 23 | 01 |
| 21. | 01 | 1056 | 1021 | 35 |
| 22. | Legal advisor Fixed Pay | 02 | 02 | - |
| Total | | 1672 | 1519 | 153 |

| | | |
|--|---|------|
| Total Employees on Roll of BS-17 & above | = | 38 |
| Total Employees on Roll of BS-01 to 16 | = | 1479 |
| Legal Advisor (Fixed Pay) on Roll | = | 02 |
| Total | = | 1519 |

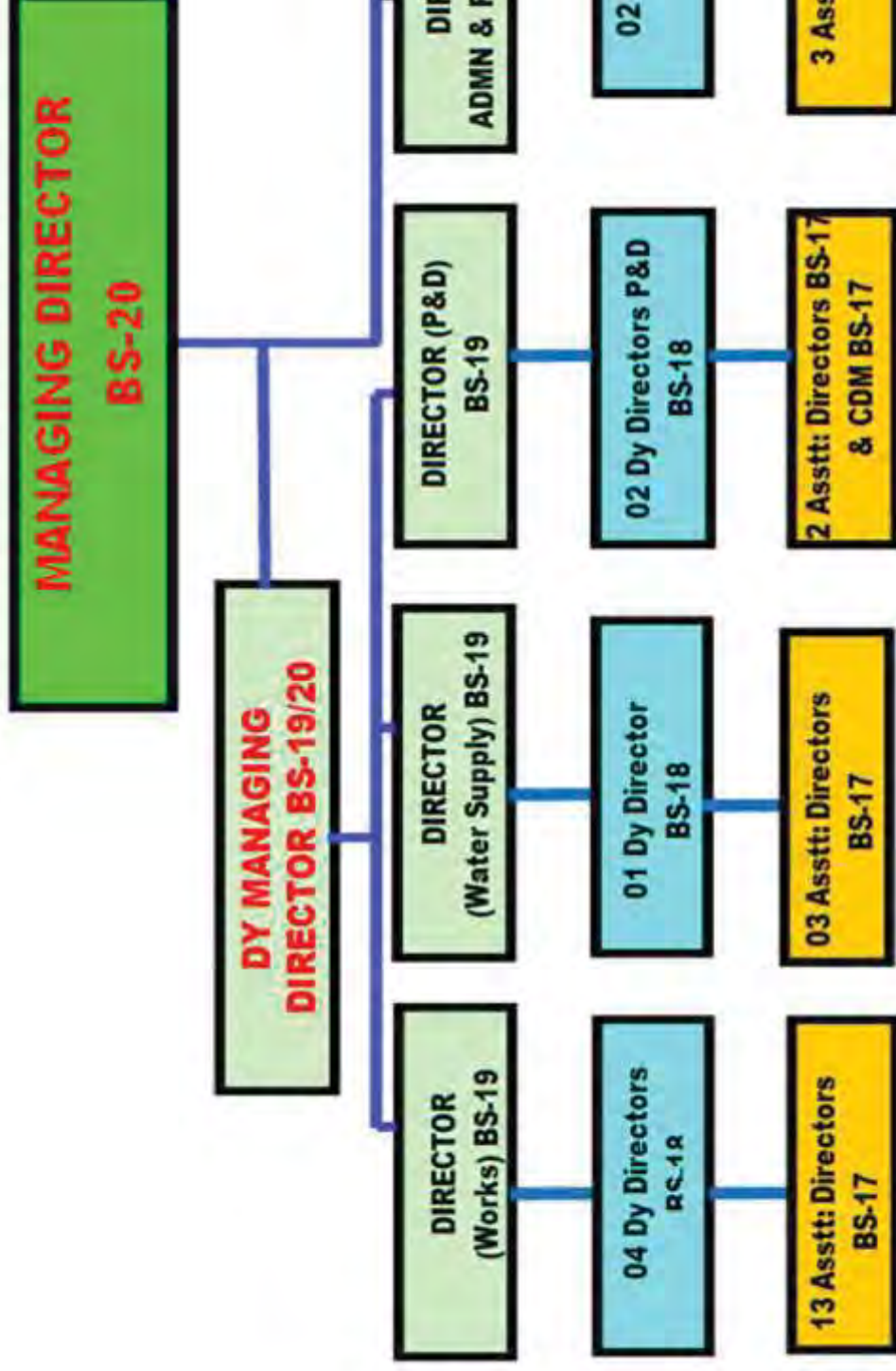
SP/12/15

Thank you for your answers.

ORGANOGRAM

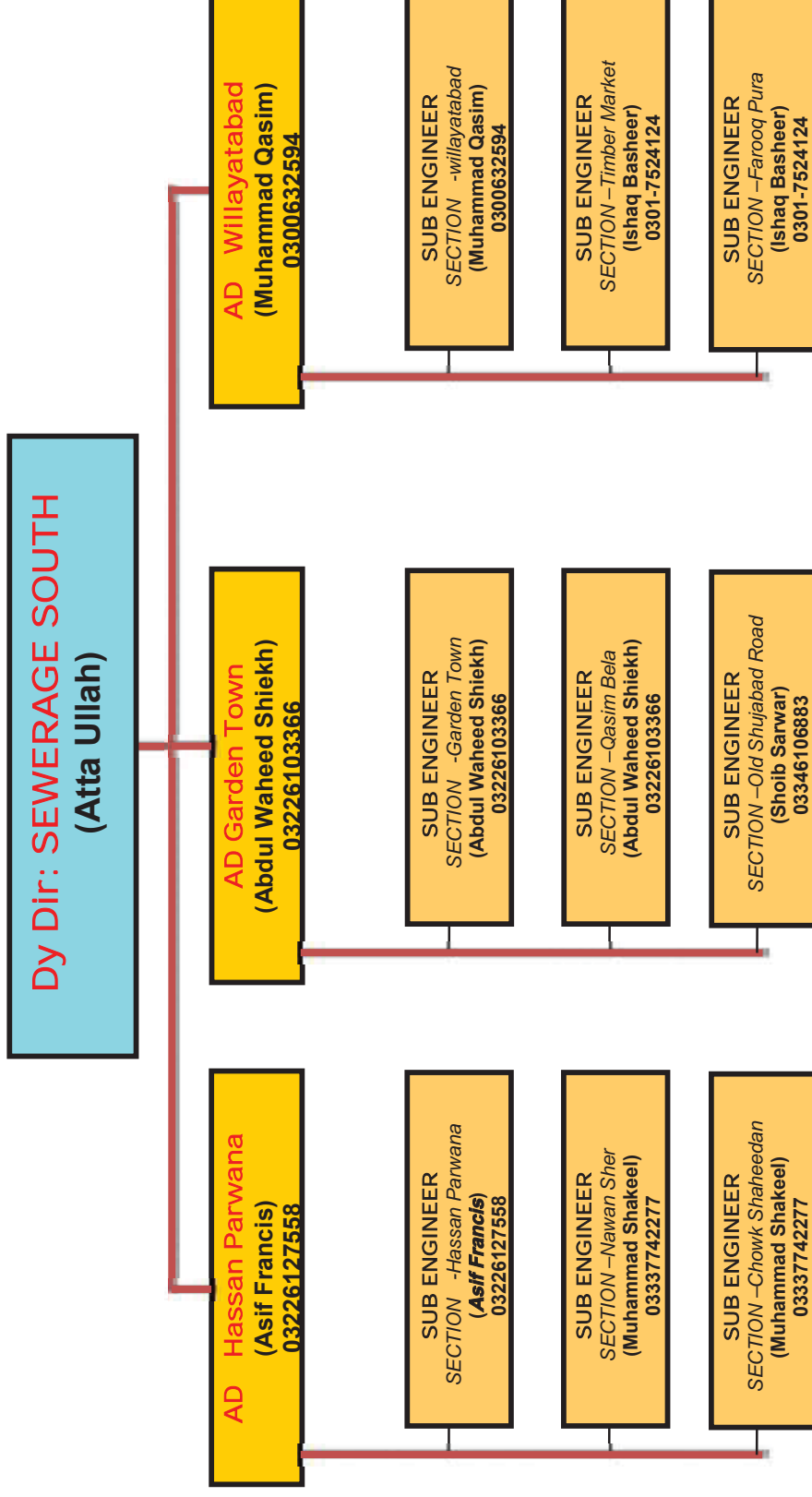
Annex - G

(Established April 1992, Jurisdiction 562 Sq.Km)

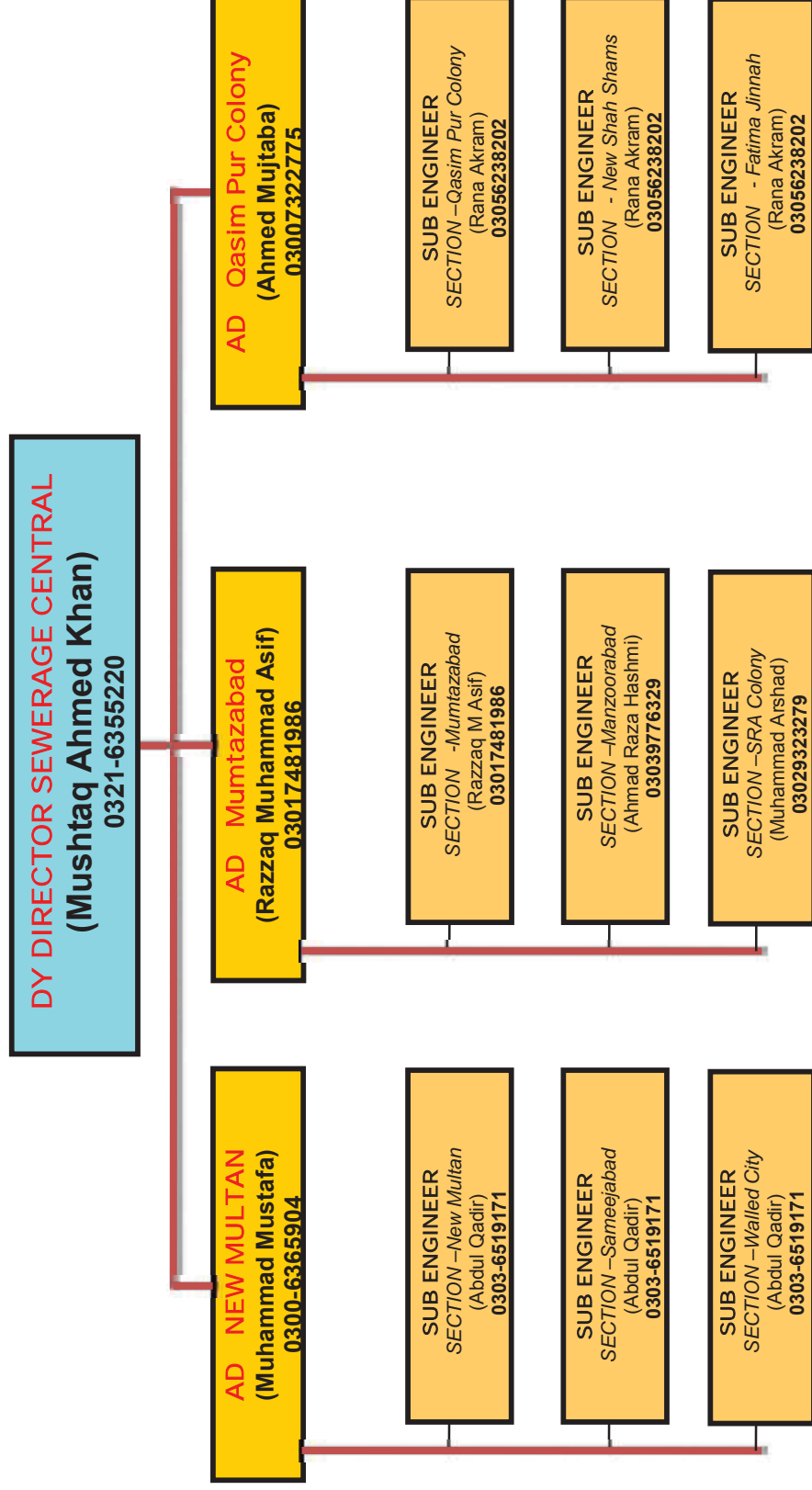


ORGANOGRAM

SEWERAGE DIVISION SOUTH

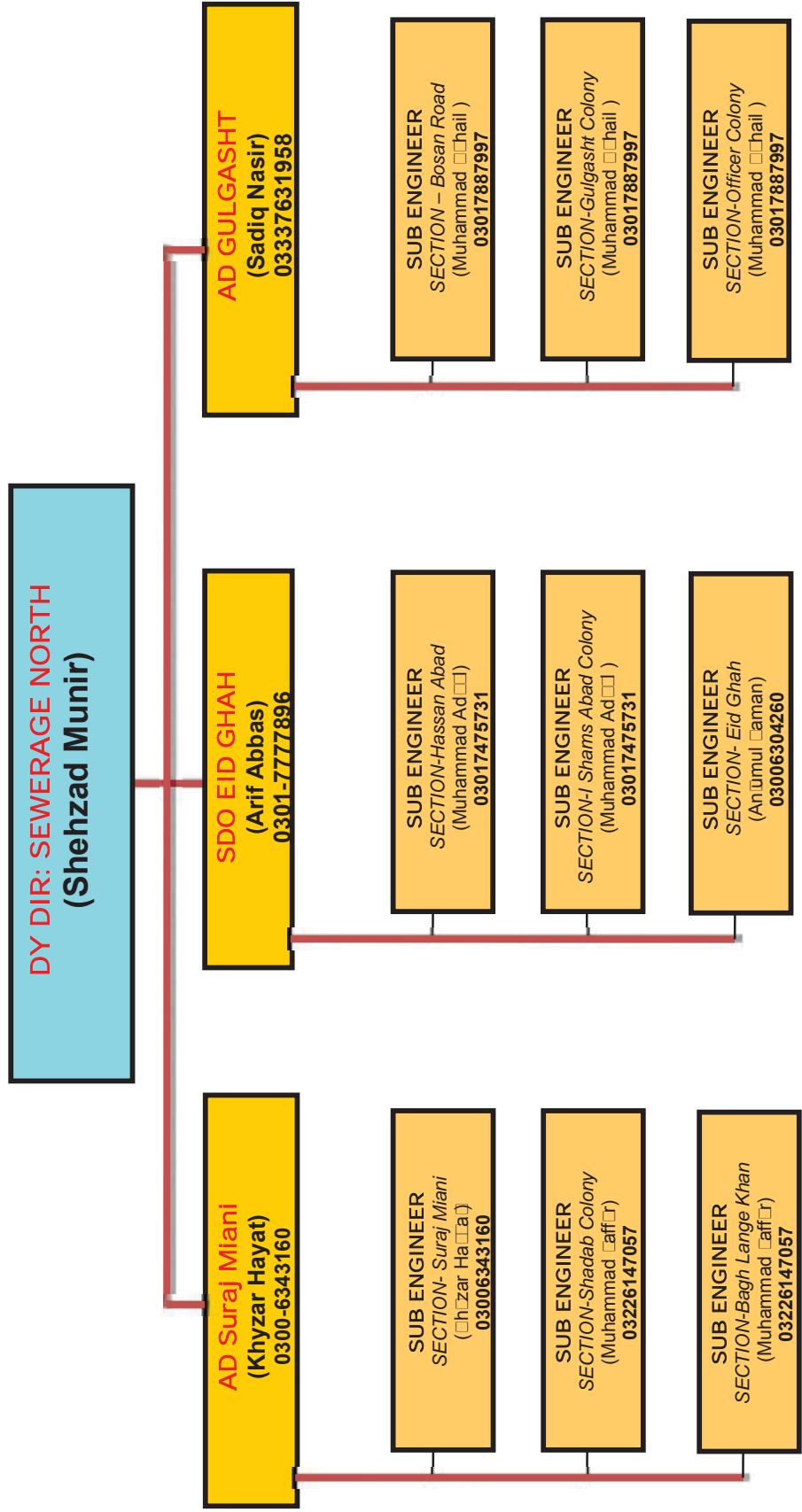


SEWERAGE DIVISION CENTRAL



ORGANOGRAM

SEWERAGE DIVISION NORTH



Water and Sanitation Agency Multan

| | | 2010-2011 | 2011-2012 | 2012-2013 | 2013-2014 | 2014-2015 | 2015-2016 |
|--|---|-----------|-----------|-----------|-----------|-----------|-----------|
| (2) Annual budget and disbursement in WASA Multan and its breakdown for the last years especially Sewers and Drainages cleanings | Annual Budget (Last 05 Years) | 39.000 | 40.500 | 52.000 | 72.745 | 86.100 | 106.000 |
| | Disbursement (Last 05 Years) | 39.000 | 37.886 | 52.000 | 72.745 | 79.838 | 0.000 |
| (2) Schedule and budget allocation for the implementation of the cleanings (operation/maintenance of the sewerage and drainage system) | Maintenance of Disposal Station | 20.400 | 21.00 | 28.000 | 31.039 | 38.000 | 44.000 |
| | Maintenance of Sewerage System North Division | 6.200 | 6.500 | 8.000 | 17.538 | 22.100 | 24.000 |
| | Maintenance of Sewerage System Central Division | 6.200 | 6.500 | 8.000 | 11.415 | 13.000 | 19.000 |
| | Maintenance of Sewerage System South Division | 6.200 | 6.500 | 8.000 | 12.753 | 13.000 | 19.000 |
| TOTAL | | 39.000 | 40.500 | 52.000 | 72.745 | 86.100 | 106.000 |

Equipment/Machinery

| Sr no | Equipment | Model | Year | Manufacturer/ country | Running hour/km | Working condition | Maintenance method | Location |
|-------|-----------------|-------------|------|----------------------------|-----------------|-------------------|--------------------|----------------|
| 1 | Wheel excavator | W-solar 180 | 2008 | Dossan /korea | 3900 hrs | ok | Through contractor | Farooq pura |
| 2 | Chain excavator | w-solar 225 | 2008 | Dossan /korea | 2270 hrs | Under repair | Through contractor | Farooq pura |
| 3 | Wheel loader | w-solar 250 | 2008 | Dossan /korea | 310 hrs | ok | Through contractor | Farooq pura |
| 4 | Tractor | MF-385 | 2007 | Millat tractors / pakistan | 5660 hrs | ok | Through contractor | Shamsabad |
| 5 | Water bozer 1 | FG | 2007 | Hino/japan | 61365 km | ok | Through contractor | Shamsabad |
| 6 | Water bozer 2 | FG | 2007 | Hino/japan | 28209 km | ok | Through contractor | Shamsabad |
| 7 | Water bozer 3 | FG | 2007 | Hino/japan | 19415 km | ok | Through contractor | Shamsabad |
| 8 | Water bozer 4 | FG | 2007 | Hino/japan | 10593 km | ok | Through contractor | Shamsabad |
| 9 | Sucker large | FG | 2006 | Hino/japan | 69303 km | ok | Through contractor | Qasam pur |
| 10 | Flusher large | FG | 2006 | Hino/japan | 32749 km | ok | Through contractor | Qasam pur |
| 11 | Mini flusher | N/A | 2005 | Isuzu/japan | 52887 km | ok | Through contractor | North division |

| | | | | | | | | |
|----|-----------------|-----|------|-------------|------------------------|--------------|--------------------|----------------|
| 12 | Flusher-III | N/A | 2005 | Isuzu/japan | 43289 km | ok | Through contractor | North division |
| 13 | Flusher-II | N/A | 2005 | Hino/japan | 52640 km | ok | Through contractor | North division |
| 14 | Mini Sucker | N/A | 2005 | Isuzu/japan | 50806 km | ok | Through contractor | North division |
| 15 | Sucker-II | N/A | 2005 | Isuzu/japan | 74129 km | ok | Through contractor | North division |
| 16 | Sucker-I | N/A | 2005 | Hino/japan | 62443 km | ok | Through contractor | North division |
| 17 | Sucker Big | N/A | 1996 | Isuzu/japan | N/A | Under repair | Through contractor | North division |
| 18 | Flusher N | FGI | 2010 | Hino/japan | 11648 km | ok | Through contractor | Hasan parwana |
| 19 | Sucker N | FGI | 2010 | Hino/japan | 36034 km | ok | Through contractor | Walayat abad |
| 20 | Flusher mini-I | NPR | 2005 | Isuzu/japan | 86198 km | ok | Through contractor | Walayat abad |
| 21 | Flusher mini-II | NPR | 2005 | Isuzu/japan | 80266 km | ok | Through contractor | Hasan parwana |
| 22 | Flusher k | FGI | 2005 | Hino/japan | 30396 km | ok | Through contractor | Garden town |
| 23 | Sucker k | FGI | 2005 | Hino/japan | 21065 km | ok | Through contractor | Garden town |
| 24 | Sucker mini-I | NPR | 2005 | Isuzu/japan | 85758 km | ok | Through contractor | Hasan parwana |
| 25 | Flusher old-II | FTR | 1997 | Isuzu/japan | Meter was out of order | ok | Through contractor | Hasan parwana |

| | | | | | | | | |
|----|----------------|-----|------|---------------|------------------------|-----------------|--------------------|---------------|
| 26 | Flusher old-I | FTR | 1995 | Isuzu/japan | Meter was out of order | ok | Through contractor | Hasan parwana |
| 27 | Sucker old | FTR | 1995 | Isuzu/japan | Meter was out of order | ok | Through contractor | Hasan parwana |
| 28 | Flusher old-I | FTR | 1995 | Isuzu/japan | Meter was out of order | ok | Through contractor | Hasan parwana |
| 29 | Water Lorry-I | N/A | 1981 | Bed ford/UK | Meter was out of order | Non-operational | Through contractor | Hasan parwana |
| 30 | Water Lorry-II | N/A | 1981 | Bed ford/UK | Meter was out of order | Non-operational | Through contractor | Hasan parwana |
| 31 | Tractor | N/A | 1981 | Belarus/china | Meter was out of order | Non-operational | Through contractor | Hasan parwana |
| 32 | Flusher large | N/A | 1995 | Isuzu/Japan | 37015 km | ok | Through contractor | New multan |
| 33 | Sucker Large | N/A | 1995 | Hino/japan | 46990 km | ok | Through contractor | New multan |

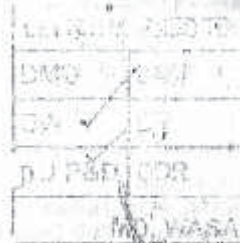
The report on master plan cannot be possible without completion of the project. The master plan is assigned to Nes-pak and contract still under process to be signed. The master plan project with Nes-pak was of 1 year .. after the completion of the project... the report will be possible. TOR report is attached below please collect it. Thank you

Subject:- **PROCEDURE REGARDING REPAIR OF WASA VEHICLES**

1. On the submission and written report of Driver that the vehicle is out of order and it needs repair.
2. After recommendation of concerned officer of WASA, the vehicle has to get repair, where the driver performs the duty
3. Then Mechanic of WASA check the vehicle and submit the report that vehicle should be sent to private workshop for getting its repair

**MOTOR TRANSPORT OFFICER
WASA (MDA) MULTAN**

MULTAN



GOVERNMENT OF THE PUNJAB
HUD&PHE DEPARTMENT

Subject: ADMINISTRATIVE APPROVAL - "MASTER PLANNING OF WATER SUPPLY, SEWERAGE AND DRAINAGE SYSTEM OF WASA MULTAN".

No.50(UD)5-10/2014: Reference PDWP meeting held on 13.04.2015, the Competent Authority is pleased to approve the scheme titled "Master Planning of Water Supply, Sewerage and Drainage System of WASA, Multan" at a cost of **Rs.87,023 million (Rupees eighty seven million and twenty three thousand only)** subject to the following:

- i. The TORs/Scope of work of the instant PC-II should be got vetted from Consultancy Wing, P&DP separately.
- ii. Consultant selection should be through transparent and competitive bidding process under Punjab Procurement Rules, 2014.
- iii. The nomenclature of the PC-II be changed from "Master Planning of Water Supply, Sewerage and Drainage System /c consumer Survey & Up-gradation of Billing system of WASA, Multan" to Master Planning of Water Supply, Sewerage and Drainage System of WASA, Multan".

2. The funds will be debitable under Grant No.PC22036(036) Development-06-Housing and Community Amenities-062-Community-0621-Urban Development-062103-Urban Planning-A-052-Grants Domestic-A-05270 to the MD, WASA, Multan.

Dated Lahore, the
June: 2015.



SECRETARY
HUD&PHE DEPARTMENT

No. & Date Even.

A copy is forwarded for information and necessary action to the Accountant General, Punjab, Lahore.



SECTION OFFICER (HUD&IT)
FINANCE DEPARTMENT

30/6/15
25/6/15
2015

No. & Date Eval.

A copy is forwarded for information and necessary action to:

- (1) The Director General, MDA, Multan.
- (2) The Managing Director, WASA, MDA, Multan.
- (3) The Chief (UD), Govt. of the Punjab, P&D Department.
- (4) The Section Officer (HUD&IT), Govt. of the Punjab, Finance Department w.r.t. his U.D.FD(HUD)2-221/2009P-1(WASA)Mun, dated 28.05.2015.
- (5) The Budget Officers (B&I), Govt. of the Punjab, Finance Department.
- (6) P.S. to Secretary, HUD & PHED.

SECTION OFFICER (UD)

24/8/15



Managing Director
(WASA)