

Annex 3:

Project Monitoring Sheets

(All versions)



To Chief Representative of JICA Nigeria Office

**PROJECT MONITORING SHEETS**

**Project Title : The Federal Capital Territory Reduction of Non-Revenue Water Project**

**Version of the Sheet: Ver. 0 (Term: - )**

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**Title: Chief Advisor**

**Submission Date: 6 November 2014**

**I. Summary**

**1 Progress**

1-1 Progress of Inputs

1-2 Progress of Activities

1-3 Achievement of Output

1-4 Achievement of the Project Purpose

1-5 Changes of Risks and Actions for Mitigation

1-6 Progress of Actions undertaken by JICA

1-7 Progress of Actions undertaken by Nigerian side

1-8 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

**2 Delay of Work Schedule and/or Problems (if any)**

2-1 Detail

2-2 Cause

2-3 Action to be taken

2-4 Roles of Responsible Persons/Organization

**3 Modification of the Project Implementation Plan**

3-1 PO

3-2 Other modifications on detailed implementation plan

(Remarks: The amendment of R/D and PDM (title of the project, duration, project site(s), target group(s), implementation structure, overall goal, project purpose, outputs, activities, and input) should be authorized by JICA HQ. If the project team deems it necessary to modify any part of R/D and PDM, the team may propose the draft.)

**4 Preparation by Nigerian side toward after completion of the Project**

**II. Project Monitoring Sheet I & II (as attached)**

**Project Monitoring Sheet I (Revision of Project Design Matrix)**

**Project Title:** The Federal Capital Territory Reduction of Non-Revenue Water Project

**Project Period:** October 2014 to March 2018

**Implementing Organization:** Federal Capital Territory Administration (FCTA) / Federal Capital Territory Water Board (FCTWB)

**Direct Beneficiaries:** FCTWB, relevant staff of FCTWB Headquarters and pilot Area Offices

**Project Site:** FCT Pilot Area Offices: Jabi, Garki I and Gudu

Version 1  
Dated 6 Nov. 2014

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<p><b>&lt;Overall Goal&gt;</b> Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB</p>	<p>a. Annual NRW ratio is reduced to X% (*) at the end of the year 2021</p> <p>Note (*): Target value (X%), which is expected to be determined in the medium-term strategic plan for NRW reduction, shall be tentatively filled when the final draft was approved by the Director of FCTWB, which shall be finalized when the plan is approved by FCTA</p>	<p>a. Record of NRW ratio kept by Distribution Department</p>			
<p><b>&lt;Project Purpose&gt;</b> Capacity of FCTWB for NRW reduction is strengthened</p>	<p>a. The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.</p> <p>b. NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB</p> <p>c. Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level</p> <p>d. NRW ratio of each PMA in the last quarter of the Project reaches its respective target (**)</p> <p>Note (**): Target for each PMA is expected to be determined by the end of the first quarter of the second year.</p>	<p>a. Date of approval of the plan</p> <p>b. Result of monitoring by NRW Management Team</p> <p>c. Results of joint assessment based on the criteria set by the Project</p> <p>d. Record of NRW ratio kept by Distribution Department</p>	<p>A. Policy support for NRW reduction is not discontinued</p> <p>B. Natural disaster/ political instability/ economic crisis that affect the service area of FCTWB do not occur</p> <p>C. Activities to implement the medium-term strategic plan are not discontinued or delayed</p>		
<p><b>&lt;Outputs&gt;</b> 1. Level of NRW of the service area of FCWTB is monitored regularly</p>	<p>1a. Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first year of the Project</p> <p>1b. Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the first year of the Project</p> <p>1c. Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors of FCTWB from the third quarter of the first year of the Project</p>	<p>1a. Monthly record of NRW ratio.</p> <p>1b&amp;1c. Material for meetings submitted by the Distribution Department</p>	<p>A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers</p>		
<p>2. Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices (*1)</p>	<p>2a. Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations</p> <p>2b. Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project</p>	<p>2a. Record of NRW ratio kept by the Distribution Department</p> <p>2b. Date of approval of the manuals</p>			
<p>3. A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2 (*2)</p>	<p>3a. By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval</p> <p>3b. By October 2017, an annual NRW reduction plan (2018) is incorporated in FCWTB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval</p> <p>3c. A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project</p>	<p>3a&amp;3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan</p> <p>3c. Date of approval of the manual</p>			

Annex 3

Note (\*1): NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection  
 Note (\*2): A medium-term strategic plan is a five-year plan, which may include medium-term target, strategies and actions, timeframe, human resource requirement, on-the-job training mechanism, cost-benefit analysis of NRW reduction, etc. It is noted that NRW components addressed by the strategic plan are not limited to the ones mentioned in (\*1) above: they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

Activities	The Nigerian Side	Inputs	The Japanese Side	Important Assumption
<p>1-1 Install bulk meters to water treatment plants 1 and 2                      1-2 Measure monthly water production of water treatment plants 1, 2, 3, and 4                      1-3 Tally the above water production data monthly                      1-4 Calculate the monthly water consumption based on the billing data                      1-5 Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4</p>	<p><b>Project Personnel</b>                      1. Project Director: Director of Economic Planning, Research and Statistics Department, FCTA                      2. Project Manager: Director of FCTWB                      3. Deputy Project Manager: HoD for Administration and Supply/FCTWB                      4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce /FCTWB                      5. Members of NRW Management Team (FCTWB):                      - Head of Special Project Unit of Distribution Department (as Coordinator)                      - Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department                      6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS)                      7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office                      8. Other personnel mutually agreed upon as necessary</p>	<p><b>Project Personnel</b>                      1. Chief Advisor / NRW Reduction Planning                      2. Deputy Chief Advisor / NRW Reduction Planning                      3. NRW Reduction Operations Management                      4. Leakage Detection Technology                      5. Commercial Loss                      6. Hydraulic Analysis / GIS                      7. Procurement Management / Coordinator                      8. Other experts mutually agreed upon as necessary</p>	<p><b>Equipment</b>                      1. Bulk meters for water treatment plants                      2. Water flow meters, valves, and customer meters for SMA                      3. Leakage detection equipment for PMA                      4. Pipe repair equipment for PMA                      5. Vehicles (Pick-ups)                      6. Other equipment mutually agreed upon as necessary</p>	<p>A Natural disaster/political/instability/economic crisis that affect the project activities do not occur</p> <p><b>Pre-Conditions</b>                      A Furnished offices for Japanese Expert Team are secured at Headquarters and each Pilot Area Office of FCTWB                      B Project Personnel is assigned with the finalized list</p>
<p>2-1 Review existing NRW reduction operations at each pilot Area Office                      2-2 Conduct capacity assessment of the relevant staff of each pilot Area Office                      2-3 Identify and select a Pilot Metering Area (PMA) for each pilot Area Office based on the selection criteria of PMA(*3)                      2-4 Prepare/update distribution network drawings for each PMA                      2-5 Install water flow meters to each PMA and measure in/outflows monthly                      2-6 Zone each PMA into Sub Metering Areas (SMA)                      2-7 Isolate a SMA by installing valves                      2-8 Update the distribution network drawings for each SMA                      2-9 Measure an initial level of NRW of each SMA                      2-10 Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA                      2-11 Develop a NRW reduction operation plan of each SMA, including reduction target, for review by Head of Distribution Department                      2-12 Review and approve NRW reduction operation plan of each SMA                      2-13 Implement the NRW reduction operations at each SMA                      2-14 Monitor the progress of the NRW reduction operations of each SMA                      2-15 Measure level of NRW of each SMA at the end of the respective operations                      2-16 Prepare a report on pilot projects, covering Activity 2-1~2-15                      2-17 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials</p>	<p><b>Land, Building and Facilities</b>                      1. Office building and facilities necessary for the implementation of the Project                      2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each Pilot Area Office, including internet connection and air conditioners                      3. Other facilities mutually agreed upon as necessary</p>	<p><b>Local Costs</b>                      1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs                      2. Administration and operational costs, including costs for local travel for the Project Personnel</p>	<p><b>Training of the Nigerian Project Personnel in Japan</b>                      Four persons mutually agreed upon will be trained in Japan annually</p>	<p><b>Issues &amp; Countermeasures</b></p>
<p>3-1 Establish a Working Group for NRW planning (*4)                      3-2 Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB                      3-3 Conduct hydraulic and water pressure distribution analyses of the pipeline networks                      3-4 Develop outlines of the medium-term strategic plan and its annual NRW reduction plan                      3-5 Develop the first medium-term strategic plan (2018-2022) for approval by FCTA                      3-6 Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA                      3-7 Develop a planning manual for NRW reduction</p>				

Note (\*3) Selection criteria of PMA are as follows: (i) Safety for night works is secured in measuring minimum night flow; (ii) Distribution network is separated and it is easy to isolate it in measuring NRW ratio; and (iii) NRW ratio is supposedly high.  
 Note (\*4) Working Group for NRW planning would consist of Project Manager (as chair), Deputy Project Manager, Technical Managers, Head of Finance Dept., Head of Production Dept., Head of PRS Unit, and members of NRW Management Team.

Project Monitoring Sheet II (Revision of Plan of Operation)

Plan of Schedule and Actual Work Period

Version 1  
 Dated 6 Nov. 2014

Activities	2014												2015												2016												2017												2018														
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42																					
<b>Output 1</b>	1-1	Surveys																																																													
1-1	RD	Identify all meters to water treatment plants. 1 and 2.																																																													
1-2	RD	Measure monthly water production of water treatment plants 1, 2, 3, and 4.																																																													
1-3	WP	Identify areas water production data is missing.																																																													
1-4	WP	Calculate the monthly water consumption based on the billing data.																																																													
1-5	RD	Calculate monthly NRW into the system based on the billing data obtained from ASHRA 1, 3 and 14.																																																													
Output 2		System Modification																																																													
2-1	RD	Review existing NRW reduction plan and update it.																																																													
2-2	RD	Conduct a survey of all areas where NRW reduction projects are established through pilot projects at Pilot Wastewater Areas (PWA) (PWA) to each Pilot Area Office based on the survey results.																																																													
2-3	WP	Identify and assess a Pilot Wastewater Area (PWA) to each Pilot Area Office based on the survey results.																																																													
2-4	WP	Prepare a detailed plan for each PWA.																																																													
2-5	WP	Finalize water flow meters to each PWA.																																																													
2-6	WP	Zone each PWA into Sub-Watering Areas (SMA).																																																													
2-7	WP	Install a SMA by installing valves in the distribution network.																																																													
2-8	WP	Measure an initial level of NRW of each SMA.																																																													
2-9	WP	Survey water consumption for each SMA.																																																													
2-10	RD	Direct target NRW components (i.e. direct leakage, illegal connection, indirect leakage).																																																													
2-11	RD	Develop a NRW reduction operation plan for each SMA, including reduction target for review by Head of Distribution operation plan of each SMA.																																																													
2-12	RD	Review and approve NRW reduction operation plan of each SMA.																																																													
2-13	RD	Implement NRW reduction operations of each SMA.																																																													
2-14	RD	Monitor the progress of the NRW reduction operations of each SMA.																																																													
2-15	RD	Operations for illegal connection, operations for customer meter, operations for direct leakage, operations for indirect leakage, operations for illegal connection.																																																													
2-16	RD	Measure NRW components (i.e. direct leakage, indirect leakage, illegal connection).																																																													
2-17	RD	Develop a plan for NRW reduction for covering Activity 2-1 to 2-15.																																																													
2-18	RD	Area Office manages and feed and (near stations), including audio-visual materials.																																																													
2-19	RD	Prepare a plan for NRW reduction for covering Activity 2-1 to 2-15.																																																													
Output 3		Review																																																													
3-1	RD	Establish a Working Group for NRW reduction.																																																													
3-2	RD	Review existing plans, implementation structure, on the job training mechanism, etc. related to NRW reduction.																																																													
3-3	RD	Conduct hydraulic and water pressure distribution analyses of the pipeline networks.																																																													
3-4	RD	Perform hydraulic analyses of the reduction plan and its impact on NRW reduction plan (approved by the Director).																																																													
3-5	RD	Develop a plan for medium-term reduction.																																																													
3-6	RD	Develop a plan for long-term reduction based on the strategic plan as an integral part of an annual recurrent and regular plan for NRW reduction by ECTA.																																																													
3-7	RD	Develop a planning manual for NRW reduction.																																																													



### Project Monitoring Sheet II (Revision of Plan of Operation)

#### Responsibility of Members

Version Dated

1  
6 Nov. 2014

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project

Activities			Responsible Organization (Nigeria)	Responsible Person (Nigeria)	Implementors (Nigeria)	JICA Experts	Other Major Input		Remarks		
							Japan	Nigeria			
<b>Output-1</b>			<b>Dist. Dpt</b>	<b>HoD(Dist)</b>		<b>Chief Advisor (CA), Dy.CA</b>					
Level of NRW of the service area of FCTWB is monitored regularly	1-1	Install bulk meters to water treatment plants 1 and 2	R/D WP	Dist. Dpt Prod. Dpt	HoU(Pipeline)/D HoU(Metering)/D	Tech Officers (Pipeline)	CA, Dy.CA	Bulk meters	Installation, O&M cost	Prod Dpt will be consulted	
	1-2	Measure monthly water production of water treatment plants 1, 2, 3, and 4	R/D WP	Dist. Dpt Prod. Dpt	HoU(Pipeline)/D HoU(Prod)/Prod	Tech Officers (Pipeline) Tech Officers (Prod)	CA, Dy.CA			If bulks are installed inside the plants, Prod Dept shall measure.	
	1-3	Tally the above water production data monthly	R/D WP	Dist. Dpt	HoU(Water Monitoring)	HoU(Water Monitoring)	CA, Dy.CA				
	1-4	Calculate the monthly water consumption based on the billing data	R/D WP	Com Dpt	HoU(Billing)/C	Billing staff	CA, Dy.CA	Cost for software			
	1-5	Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4	R/D WP	Dist. Dpt	HoU(Logistics)/D	Logistics officer	CA, Dy.CA				
<b>Output-2</b>			<b>Dist. Dpt, Com. Dept</b>	<b>HoD(Dist)(Com)</b>		<b>CA and other Experts</b>	Vehicles	O&M cost			
Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices	2-1	Review existing NRW reduction operations at each pilot Area Office	R/D WP	Dist. Dpt, Com. Dpt	HoD(Dist)(Com)	AM, AAM (Dist)(Com)	CA, Dy.CA, NRW reduction				
	2-2	Conduct capacity assessment of organization and the relevant staff	R/D WP	Dist. Dpt, Com. Dpt	HoD(Dist)(Com)	NRW Mgt Team	CA and other Experts				
	2-3	Identify and select a Pilot Metering Area (PMA) for each Pilot Area Office based on the selection criteria of PMA	R/D WP	Dist. Dpt, Com. Dpt	HoD(Dist)(Com)	NRW Mgt Team AM, AAM (Dist)(Com)	CA, Dy.CA, NRW reduction				
	2-4	Prepare/update distribution network drawings for each PMA	R/D WP	Dist. Dpt	HoD(Dist)	HoU(Logistics)&officers HoU(GIS)&officers	NRW reduction, Hydraulic analysis				
	2-5	Install water flow meters to each PMA and measure in/outflows monthly	R/D WP	Dist. Dpt	Area Manager(AM)	AAM(Dist) Tech Officers(Dist)	NRW reduction, Hydraulic analysis	Water flow meters	Installation and O&M cost		
	2-6	Zone each PMA into Sub Metering Areas (SMA)	R/D WP	Dist. Dpt	HoU(Logistics)/D HoU(Metering)/D	AM, AAM(Dist)(Com) HoU(GIS)&officers	NRW reduction, Hydraulic analysis				
	2-7	Isolate a SMA by installing valves	R/D WP	Dist. Dpt	AM	Tech Officers(Dist) AAM(Dist)	NRW reduction	Valves	Installation and O&M cost		
	2-8	Update the distribution network drawings for each SMA	R/D WP	Dist. Dpt	HoU(Logistics)/D	AAM(Dist),HoU(GIS)&officers HoU(Logistics)&officers	NRW reduction, Hydraulic analysis				
	2-9	Measure an initial level of NRW of each SMA	R/D WP	Dist. Dpt	HoD(Dist)		NRW reduction				
	Each SMA		Measure in/outflows		Area Office	AAM(Dist)	Tech Officers(Dist)	NRW reduction			
			Survey water consumption		Area Office	AAM(Com)	Meter Readers(Com)	NRW reduction			
			Calculate NRW ratio		Dist Dpt	HoU(Logistics)/D	Logistics Officer	NRW reduction			
	2-10	Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA	R/D WP	Dist. Dpt, Com. Dpt	AM		NRW reduction				
		Detect invisible leakage		Dist. Dpt	AAM(Dist)	Tech Officers(Dist)	Leakage detection	Detection equip.	O&M cost	Staff of Pipeline Unit (Dist) will join.	
		Detect customer meter malfunction		Com. Dpt	AAM(Com), HoU(Metering)/D	Meter Readers(Com)	Com Loss				
		Detect illegal connection		Dist. Dpt, Com. Dpt	AAM(Dist)(Com),HoU(Detect)/C	Meter Readers(Com)	Com Loss			Staff of Detection Unit (Com) will join.	
	2-11	Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of Distribution Department	R/D WP	Dist. Dpt	AM	AAM (Dist)(Com)	NRW reduction, Leakage detection, Com Loss				
	2-12	Review and approve NRW reduction operation plan of each SMA	R/D WP	Dist Dpt	HoD(Dist)	Relevant HoUs	NRW reduction				
	2-13	Implement NRW reduction operations at each SMA	R/D WP	Dist. Dpt, Com. Dpt	AM		NRW reduction				
		Operation for invisible leakage		Dist. Dpt	AAM(Dist)	Tech Officers(Dist)	Leakage detection	Repair equip.	Repair cost		
	Operation for customer meter		Com. Dpt	AAM(Com), HoU(Metering)/D	AAM(Com), HoU(Metering)/D	Com Loss	Cust. Meters	Install, O&M cost			
	Operation for illegal connection		Dist. Dpt, Com. Dpt	AAM(Dist)(Com),HoU(Detect)/C	AAM(Dist)(Com),HoU(Detect)/C	Com Loss					
2-14	Monitor the progress of the NRW reduction operations of each SMA	R/D WP	Area Office	AM		NRW reduction					
	Operation for invisible leakage		Dist. Dpt	AAM(Dist)	Tech Officers(Dist)	Leakage detection					
	Operation for customer meter		Com. Dpt	AAM(Com), HoU(Metering)/D	AAM(Com), HoU(Metering)/D	Com Loss					
	Operation for illegal connection		Dist. Dpt, Com. Dpt	AAM(Dist)(Com),HoU(Detect)/C	AAM(Dist)(Com),HoU(Detect)/C	Com Loss					
2-15	Measure level of NRW of each SMA at the end of the respective operations	R/D WP	Area Office	AM		NRW reduction					
	Measure in/outflows		Area Office	AAM(Dist)	Tech Officers(Dist)	NRW reduction					
	Survey water consumption		Area Office	AAM(Com)	Meter Readers(Com)	NRW reduction					
	Calculate NRW ratio		Dist Dpt	HoU(Logistics)/D	Logistics Officer	NRW reduction					
2-16	Prepare a report on pilot projects, covering Activity 2-1-2-15	R/D WP	Dist. Dpt, Com. Dpt	HoD(Dist)(Com)	NRW Mgt Team, AM,	CA, Dy.CA, NRW reduction, Leakage detection, Com loss					
2-17	Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials	R/D WP	Dist. Dpt, Com. Dpt	HoD(Dist)(Com)	NRW Mgt Team, AM, AAM (Dist)(Com)	CA, Dy.CA, NRW reduction, Leakage detection, Com Coordinator					
<b>Output-3</b>			<b>FCTWB</b>	<b>PM</b>		<b>CA, Dy.CA</b>					
A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2	3-1	Establish a Working Group for NRW reduction planning	R/D WP	FCTWB	PM	Working Group	CA, Dy.CA, NRW reduction				
	3-2	Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB	R/D WP	FCTWB	PM	Working Group	CA, Dy.CA, NRW reduction				
	3-3	Conduct hydraulic and water pressure distribution analyses of the pipeline networks	R/D WP	Dist Dpt	HoU(Logistics)/D HoU(Pipeline)/D	HoU(Logistics)&officers HoU(GIS)&officers HoU(Pipeline)&officers	Hydraulic analysis				
	3-4	Develop outlines of the medium-term strategic plan and its annual NRW reduction plan (approval by the Director)	R/D WP	FCTWB	PM	Working Group	CA, Dy.CA, NRW reduction				
	3-5	Develop the first medium-term strategic plan (2016-2022) for approval by FCTA	R/D WP	FCTWB	PM	Working Group	CA, Dy.CA, NRW reduction				
	3-6	Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA	R/D WP	FCTWB	PM	Working Group	CA, Dy.CA, NRW reduction				
	3-7	Develop a planning manual for NRW reduction	R/D WP	FCTWB	PM	Working Group	CA, Dy.CA, NRW reduction				



## Project Monitoring Sheet II (Revision of Plan of Operation)

## Responsibility of Members

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project

Version Dated 1  
6 Nov. 2014

Inputs (the Japanese side)			Remarks						
<b>JICA Expert</b>									
1	Akinori MIYOSHI Chief Advisor / NRW Reduction Planning	R/D WP							
2	Taketoshi FUJIYAMA Deputy Chief Advisor / NRW Reduction Planning	R/D WP							
3	Toru TOYODA NRW Reduction Operations Management	R/D WP							
4	Kiyoshi KIYAMA Leakage Detection Technology	R/D WP							
5	Takuji OKUBO Commercial Loss	R/D WP							
6	Shinta SEGAWA Hydraulic Analysis / GIS	R/D WP							
7	Kazuhiro ISHIURA Procurement Management / Coordinator	R/D WP							
<b>Equipment</b>									
1	Leakage detection equipment *3PMAs in Japan (JICA)	R/D WP							
2	Bulk meters (ultrasonic flow meter) *WTP in Japan (JICA Expert)	R/D WP							
3	Water meter, flow meter and valves *3PMAs in Nigeria (JICA Expert)	R/D WP							
4	Pipe repair equipment *3PMAs in Nigeria (JICA)	R/D WP							
5	Vehicles (Pickup truck) *Leakage Detection in Nigeria (JICA)	R/D WP							
6	GIS software, office equipment *FCTWB HQs in Nigeria (JICA)	R/D WP							
<b>Local Consultant</b>									
1	Modification of billing and collection System	R/D WP							
2	GIS and database training	R/D WP							
<b>Training in Japan</b>									
		R/D WP							
<b>Duration / Phasing</b>									
		R/D WP							
<b>Monitoring Plan</b>			Responsible Organization (Nigeria)	Responsible Person (Nigeria)	Implementors (Nigeria)	JICA Experts	Other Major Input Japan Nigeria		Remarks
<b>Planning, Monitoring and Coordination</b>									
1	Organize Joint Coordination Committee (JCC)	R/D WP	FCTWB	PM	Dy. PM	CA and other Experts			
2	Develop Detail Plan of Operations (DPO) for review and approval by JCC	R/D WP	FCTWB	PM	Dy. PM, NRW Mgt Team, AM	CA and other Experts			
3	Develop Annual Plan of Operations (APO) for review and approval by JCC	R/D WP	FCTWB	PM	Dy. PM, NRW Mgt Team, AM	CA and other Experts			
4	Organize monthly technical meetings	R/D WP	Dist. Dpt. Com. Dpt	NRW Mgt Team Coordinator	NRW Mgt Team, AM	CA and other Experts			
5	Organize quarterly project meetings	R/D WP	FCTWB	PM	Dy. PM, NRW Mgt Team, AM	CA and other Experts			
6	Conduct Joint Monitoring semi-annually	R/D WP	FCTWB	PM	Dy. PM, NRW Mgt Team, AM	CA and other Experts			
7	Submit Monitoring Sheet to JICA Nigeria Office semi-annually	R/D WP				CA, Dy.CA			
8	Monitoring Mission from JICA for Joint Review	R/D WP	JICA	JICA HQ	To be determined				
9	Organize information sharing seminars for FCTWB/FCTA, including Area Offices	R/D WP	FCTWB	PM	Dy.PM	CA and other Experts			
10	Collect and organize data for Indicators of PDM	R/D WP	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts			
a	Develop criteria for capacity assessment for each level of the relevant staff (i.e. members of NRW Mgmt and Action Teams)	R/D WP	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts			
b	Conduct joint capacity assessment of the relevant staff ※Prepare Capacity Development (CD) Plan	R/D WP	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts			
c	Set reduction target for each PMA by the first quarter of the second year	R/D WP	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts			
d	Collect and organize for Indicators for semi-annual Joint Monitoring	R/D WP	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts			
<b>Reports / Documents</b>									
11	Work Plan	R/D WP	FCTWB	PM	Dy. PM, NRW Mgt Team				
12	Project Progress Report	R/D WP	FCTWB	PM	Dy. PM, NRW Mgt Team				
13	Project Completion Report	R/D WP	FCTWB	PM	Dy. PM, NRW Mgt Team	CA and other Experts			
<b>Public Relations</b>									
14	Develop Project Website	R/D WP	FCTWB	PM	NRW Mgt Team, HoU(PR)	CA, Dy.CA, Coordinator			
15	Preparation of public relations materials	R/D WP	FCTWB	PM	NRW Mgt Team, HoU(PR)	CA, Dy.CA, Coordinator		Public Relation Unit under Director(PM) will collaborate	
<b>Monitoring and Evaluation in the Post-Project period</b>									
16	Post Monitoring by JICA (not described here)		JICA						
17	Post Evaluation by JICA (not described here)		JICA						



To Chief Representative of JICA Nigeria Office

## PROJECT MONITORING SHEETS

**Project Title : The Federal Capital Territory Reduction of Non-Revenue Water Project**

**Version of the Sheet: Ver. 1 (Term covered: October, 2014 - June, 2015)**

**Name: Akinori Miyoshi**

**Title: Chief Advisor**

**Submission Date: 23 June 2015**

### I. Summary

#### 1 Progress

##### 1-1 Progress of Inputs

###### **[The Nigerian Side]**

All project members including Project Director, Project Manager, Deputy Project Manager, Technical Managers, Non-Revenue Water (NRW) Management Team members, NRW Action Team members confirmed his/her roles and responsibilities and have been involved in the Project since the beginning of the Project. See the Annex-1: Project Member List.

Office spaces and necessary facilities including internet connection for the Japan International Cooperation Agency (JICA) Experts have been provided in the Federal Capital Territory Water Board (FCTWB) Headquarters, but their works have suffered from unstable and inadequate electricity supply by power holding company as well as standby generator of FCTWB.

###### **[The Japanese Side]**

As of the end of June 2015, JICA Experts consisting of a Chief Advisor and six members have been assigned to work in Nigeria dispatched for about 16 man-months from November 2014, except for most of the period from January to April 2015.

Geographical Information System (GIS) software and all office equipment such as copier, personal computer, printer, etc. were procured and will be handed over to FCTWB soon.

Equipment such as ultrasonic flow meter and leakage detector are in the process of procurement in Japan, which is scheduled to be shipped by air around October 2015.

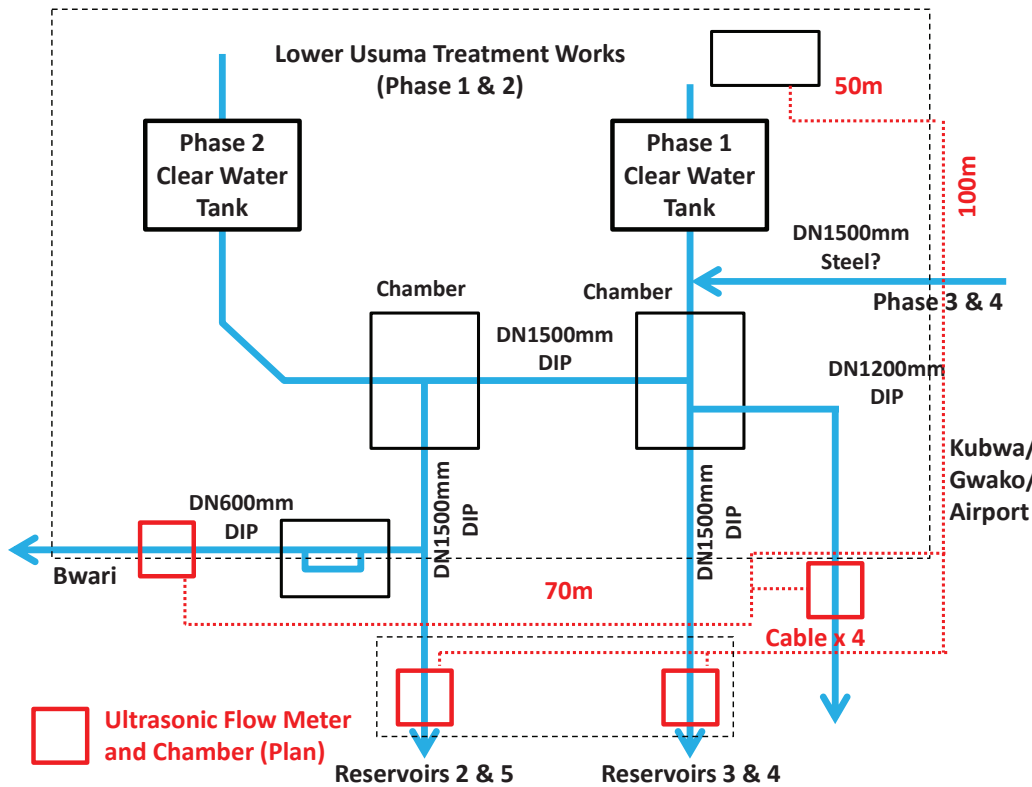
The first training of the Nigerian project personnel in Japan was rescheduled from May 2015 to August 2015.

##### 1-2 Progress of Activities

###### **[Activities for Output-1: Level of NRW of the service area of FCTWB is monitored regularly.]**

Facility designing of chambers for bulk flow meters at outlet of water treatment plant, aiming to measure total inflow to the whole water supply system, as well as specifying the meters were

completed, and then Bill of Quantities (BoQ) was prepared based on the design. While four bulk flow meters (ultrasonic) are being procured by JICA in Japan, preparation of chamber construction has been suspended due to inadequate Counterpart Fund of FCTWB for implementation.



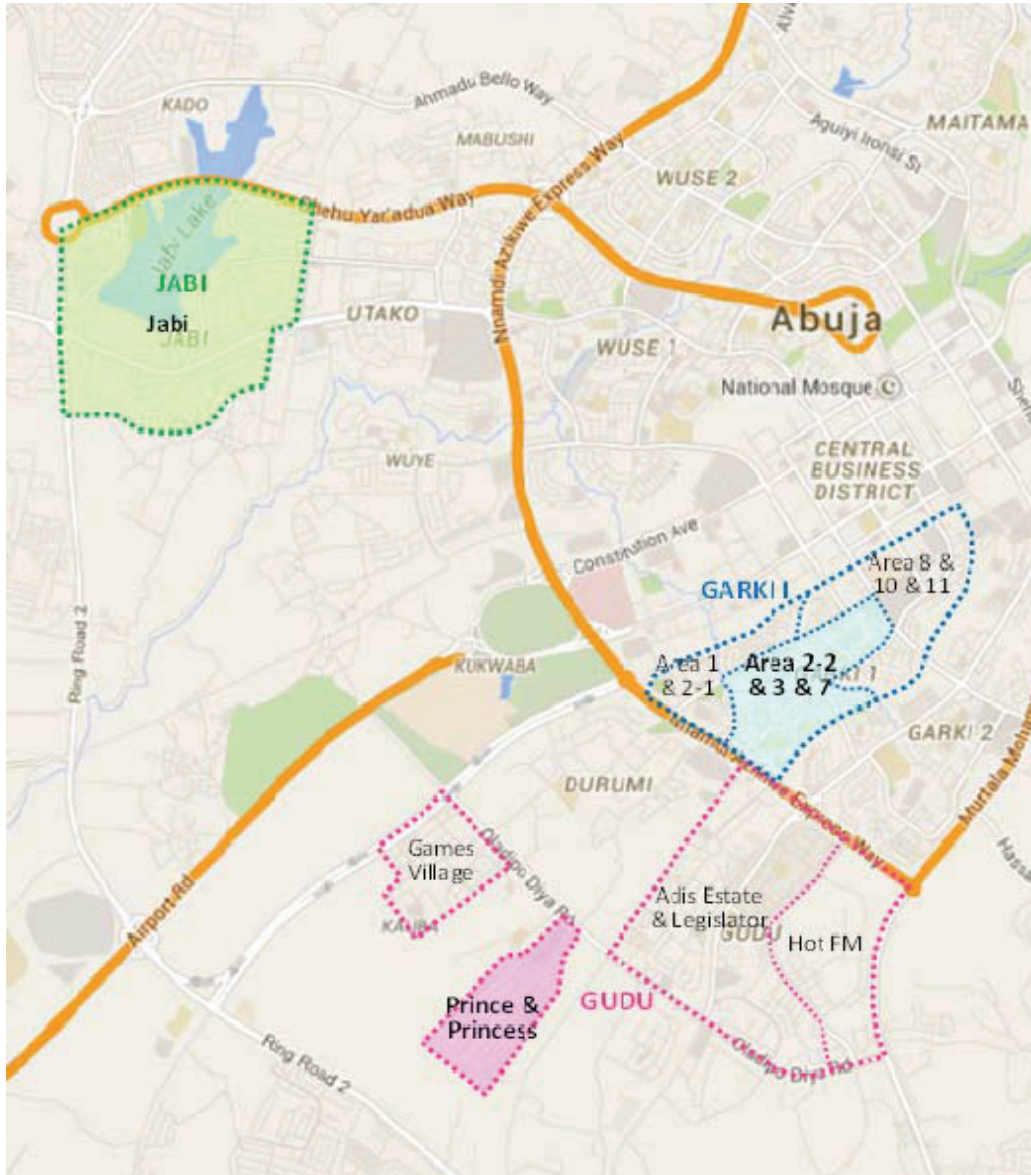
**Figure 1 Schematic of Location of Bulk Flow Meter (Ultrasonic)**

Situation of billing management of FCTWB have been assessed for modification of the existing billing system in order to measure total outflow from the whole water supply system. JICA Experts pointed out that a large number of existing duplicated/return bills may have caused various wastefulness as well as unreliable financial analysis including NRW. Specification of billing system will be discussed and determined only after fact finding and shows the way to treating these kinds of bills properly such as invalidation or elimination.

**[Activities for Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

Existing NRW reduction operations were reviewed at the FCTWB Headquarters and pilot Area offices, and also in order to find out baseline level, assessment of FCTWB’s organizational capacity and individual capacity of project members. The assessment results are shown in “Capacity Assessment and Capacity Development Plan, March 2015”, which was approved by FCTWB.

FCTWB and JET jointly confirmed one PMA for each of three Pilot Area Office selected from the several PMA which meet selection criteria, namely “Area 2-2 & 3 & 7” (approx. 1,400 customers) under Garki I Area Office, “Prince & Princess” (approx. 1,100) under Gudu Area Office and “Jabi” (approx. 900) under Jabi Area Office.



**Figure 2 Location Map of Pilot Metering Areas (PMAs)**

Subsequently, each selected PMA was zoned into some Sub-Metering Areas (SMAs) which NRW reduction operations will be implemented in the field such as leakage detection, replacement of malfunctioning water meters and detection of illegal connections.

Following designing and zoning of PMAs/SMAs, distribution network drawings have been prepared by GIS together with information gathering from related Units and Area Offices.

Facility designing of chambers for water flow meters and boundary/isolation valves in PMA, aiming to measure monthly in/outflow, as well as specifying the meters were completed, and then BoQ was prepared based on the design. While the meters will be procured by JICA Experts in Nigeria, preparation of chamber construction has been suspended due to inadequate Counterpart Fund of FCTWB for implementation.

In the current situation that PMAs/SMAs have not yet been created physically (NRW reduction operations cannot be implemented in the selected PMAs/SMAs), JICA Experts have held theoretical lectures for NRW Management Team and NRW Action Team members as well as on-the-job training (OJT) to the extent possible.

**[Activities for Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

Members of Working Group for NRW reduction planning were selected and existing plans, implementation structure, OJT mechanism, etc. related to NRW reduction at FCTWB were reviewed preliminarily. Most of activities for Output-3 will be done in Phase-2 of the Project scheduled in 2017 and 2018, but a few activities were done.

**1-3 Achievement of Output**

**[Output-1: Level of NRW of the service area of FCTWB is monitored regularly.]**

**Indicator:** 1a: Record of monthly NRW ratio is kept.

1b: Monthly NRW ratio is reported.

1c: Quarterly NRW ratio is reported.

Current Status: Significant progress / On track / Little progress / Delayed / To be revised,

\* As stated in Section 2-1 Detail, 2 Delay of Work Schedule and/or Problems (if any), necessary data cannot be measured due to delay of activities, but actions have been taken.

Target Date of Achievement: Indicator 1a&1b will be obtained from April 2016, Indicator 1c from October 2016.

**[Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

**Indicator:** 2a: Decrease rate of NRW ratio for each Sub Metering Area reaches at least 80% of its target.

2b: Technical manuals are approved.

Current Status: Significant progress / On track / Little progress / Delayed / To be revised,

\* As stated in Section 2-1 Detail, 2 Delay of Work Schedule and/or Problems (if any), necessary data cannot be measured due to delay of activities, but actions have been taken, and theoretical lectures and preparation of drawings through OJT have been done.

Target Date of Achievement: Indicator 2a will be obtained from November 2016, Indicator 2b from June 2016.

**[Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

**Indicator:** 3a: Draft medium-term strategic plan (2018-2022) is submitted by FCTWB to FCTA.

3b: An annual NRW reduction plan (2018) is incorporated in FCTWB's annual recurrent and capital plan (2018).

3c: A planning manual for NRW reduction is approved.

Indicator will be obtained in Phase-2 of the Project scheduled in 2017 and 2018, but Working Group members were selected and existing plans, etc. related to NRW reduction at FCTWB were reviewed preliminarily.

**1-4 Achievement of the Project Purpose**

**[Project Purpose: Capacity of FCTWB for NRW reduction is strengthened.]**

**Indicator:** a: The medium-term strategic plan (2018-2022) is approved by FCTA.

b: NRW reduction operations of the first quarter of 2018 are carried out.

c: Relevant staff become equipped with skills and knowledge necessary for NRW reduction.

d: NRW ratio of each PMA in the last quarter of the Project reaches its respective target.

Indicator cannot be obtained because of limited progress, but skills and knowledge necessary for NRW reduction has been gradually developed through lectures and OJT.

**1-5 Changes of Risks and Actions for Mitigation**

No concerns over project implementation, but inadequate power supply and time-consuming procedures for custom clearance / tax exemption may be negatively affect smooth operation of the project.

**1-6 Progress of Actions undertaken by JICA**

To mitigate the above electricity problems that caused difficulty in efficient works at the project office, as an extra input, JICA decided to procure a standby generator with wiring work for the project office to ensure smooth implementation of the Project.

Regarding equipment in the process of procurement in Japan such as ultrasonic flow meter and leakage detector, JICA will provide necessary information to FCTWB in a timely manner for

smooth customs clearance and tax exemption. Close communication with relevant agencies including FMOF and FMWR is important.

As mentioned in Section 1-1, Progress of Inputs, GIS software and all office equipment were procured and will be handed over to FCTWB soon. Vehicles and materials such as valves, water meters for pilot project implementation have not yet been procured.

Specifications of modification of billing system and GIS training to be contracted out to local company by JICA Experts have been discussed.

JICA has prepared the first training of the Nigerian project personnel in Japan scheduled in August 2015.

### **1-7 Progress of Actions undertaken by Nigerian side**

FCTWB will work on the above customs clearance and tax exemption. Provision of necessary information will be requested to JICA in a timely manner. Close communication is important.

FCTWB has worked on securing necessary budget for the Project, namely Counterpart Fund, but the currently available amount is not sufficient to implement necessary project activities such as construction of chambers (see Section 2-1). Expenses for field activities such as repair related to Output-2 have not yet come up.

Security measures for JICA Experts in the field activities have been considered such as issue of identification card.

As mentioned in Section 1-1, Progress of Inputs, office spaces and necessary facilities including internet connection for JICA Experts have been provided in FCTWB Headquarters, but those in pilot Area Offices have been in preparation.

### **1-8 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)**

None

## **2 Delay of Work Schedule and/or Problems (if any)**

### **2-1 Detail**

#### **(1) Insufficient 2015 Counterpart Fund**

It has caused delay or postpone of activities not only for Output-1, particularly Activity 1-1 related to bulk flow meter installation at outlet of water treatment plant, followed by 1-2 and 1-5, but also



for Output-2, particularly Activity 2-5 and 2-7 related to PMAs/SMAs creation by installing flow meters and valves in pilot projects, followed by 2-9 to 2-17. This also has delayed preparation of procurement of flow meters and valves for Activity 2-5 and 2-7.

**(2) Existing duplicated/return bills**

It may have caused unreliable financial analysis including NRW and therefore needs to be solved prior to the modification of billing system.

**2-2 Cause**

**(1) Insufficient 2015 Counterpart Fund**

Request of Counterpart Fund was approved by FCTA, but it has been disbursed partially. Although it is general in Nigeria, that government authorities and parastatals suffer from irregularity and shortfall of budget, situation is more unsound than usual, especially this presidential-election year.

**(2) Existing duplicated/return bills**

FCTWB has not been able to completely and effectively treat duplicated/return bills for a long period.

**2-3 Action to be taken**

**(1) Insufficient 2015 Counterpart Fund**

JICA Experts proposed cost-reducing modification of PMA/SMA design and downscaling chamber to casing or temporary excavation, but total cost still exceeded the current limited fund. FCTWB and JICA Experts adopt an interim alternate plan to avoid suspension of project implementation due to inadequate Counterpart Fund, which intends to carry on activities in three PMAs with developing capacity of NRW reduction and maintaining motivation of project members. The plan prioritized construction of valve casings in a few selected SMAs in each PMA within the current limited fund, and pilot projects will be implemented on a SMA basis. Monthly in/outflow in PMAs will be estimated by measurement using ultrasonic flow meter to be installed in temporary excavation. FCTWB will proceed to reconfirm size of valve and construction of valve casing, meanwhile, JICA Experts will prepare procurement of valves and fittings.

**(2) Existing duplicated/return bills**

JICA Experts suggested postponing modification of billing system proactively and encouraged FCTWB to treat duplicated/return bills by invalidation or elimination. FCTWB has constituted a committee to clarify facts accurately and then will take measures properly against these kinds of bills. Fact finding has started and collected information will be analyzed by FCTWB with support from JICA Experts.

## **2-4 Roles of Responsible Persons/Organization**

### **[FCTWB]**

- Reconfirmation of pipe size and material where valves will be installed: Pipeline Unit and pilot Area Offices under supervision of Head of Department (HOD) Distribution.
- Preparation and procurement/construction of valve casings: Pipeline Unit, Logistics Unit and Unit in charge of procurement under supervision of HOD Administration & Supply and HOD Distribution.
- Forming a committee for duplicated/return bills: HOD Commerce.
- Fact finding of duplicated/return bills: relevant units and all Area Offices under supervision of HOD Commerce.
- Analysis of collected information of duplicated/return bills: Monitoring and Detection Unit under supervision of HOD Commerce.
- Taking measures against duplicated/return bills such as invalidation or elimination: relevant units under supervision of HOD Commerce.

### **[JICA Experts]**

- Support to reconfirmation of pipe size and material where valves will be installed.
- Support to preparation and procurement/construction of valve casings.
- Procurement of valves and fittings.
- Support to analysis of collected information of duplicated/return bills.

## **3 Modification of the Project Implementation Plan**

### **3-1 Plan of Operation**

Due to the above problems and other reasons, Plan of Operation (PO) has been revised. See the Project Monitoring Sheet II as attached.

### **3-2 Other modifications on detailed implementation plan**

(Remarks: The amendment of R/D and PDM (title of the project, duration, project site(s), target group(s), implementation structure, overall goal, project purpose, outputs, activities, and input) should be authorized by JICA HQ. If the project team deems it necessary to modify any part of R/D and PDM, the team may propose the draft.)

None

## **4 Preparation by Nigerian side toward after completion of the Project**

To be considered.

**II. Project Monitoring Sheet I & II (as attached)**

**Annex**

Annex-1: Project Member List

**Project Monitoring Sheet I (Revision of Project Design Matrix)**

**Project Title:** The Federal Capital Territory Reduction of Non-Renewable Water Project  
**Project Period:** October 2014 to March 2018  
**Implementing Organization:** Federal Capital Territory Administration (FCTA) / Federal Capital Territory Water Board (FCTWB)  
**Direct Beneficiaries:** FCTWB, relevant staff of FCTWB Headquarters and pilot Area Offices  
**Project Site:** FCT  
**Pilot Area Offices:** Jabi, Garki I and Gudu

Version 1  
 Dated 6 Nov. 2014

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<p>&lt;Overall Goal&gt;                      Level of Non-Renewable Water (NRW) is reduced at the service area of FCTWB</p>	<p>a. Annual NRW ratio is reduced to X%<sup>(*)</sup> at the end of the year 2021</p> <p>Note<sup>(*)</sup>: Target value (X%), which is expected to be determined in the medium-term strategic plan for NRW reduction, shall be tentatively filled when the final draft was approved by the Director of FCTWB, which shall be finalized when the plan is approved by FCTA</p>	<p>a. Record of NRW ratio kept by Distribution Department</p>	<p>Indicator cannot be obtained because of limited progress.</p>		
<p>&lt;Project Purpose&gt;                      Capacity of FCTWB for NRW reduction is strengthened</p>	<p>a. The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.                      b. NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB                      c. Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level                      d. NRW ratio of each PMA in the last quarter of the Project reaches its respective target<sup>(**)</sup></p> <p>Note<sup>(**)</sup>: Target for each PMA is expected to be determined by the end of the first quarter of the second year</p>	<p>a. Date of approval of the plan                      b. Result of monitoring by NRW Management Team                      c. Results of joint assessment based on the criteria set by the Project                      d. Record of NRW ratio kept by Distribution Department</p>	<p>A. Policy support for NRW reduction is not discontinued                      B. Natural disaster/ political instability/ economic crisis that affect the service area of FCTWB do not occur                      C. Activities to implement the medium-term strategic plan are not discontinued or delayed</p>	<p>Indicator cannot be obtained because of limited progress, but necessary knowledge for NRW reduction has been gradually developed through lectures and OJT.</p>	<p>See the Output-2 of Monitoring Sheet II</p>
<p>Annex 1                      &lt;Outputs&gt;                      1. Level of NRW of the service area of FCTWB is monitored regularly</p>	<p>1a. Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first year of the Project                      1b. Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the first year of the Project                      1c. Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors of FCTWB from the third quarter of the first year of the Project</p>	<p>1a. Monthly record of NRW ratio.                      1b&amp;1c. Material for meetings submitted by the Distribution Department</p>	<p>A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers</p>	<p>Indicator cannot be obtained because measurement of inflow and outflow to/from distribution system is not ready.</p>	<p>See the Output-1 of Monitoring Sheet II</p>
<p>2. Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices<sup>(*)</sup></p>	<p>2a. Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations                      2b. Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project</p>	<p>2a. Record of NRW ratio kept by the Distribution Department                      2b. Date of approval of the manuals                      3a&amp;3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan                      3c. Date of approval of the manual</p>	<p>Indicator cannot be obtained because pilot projects are still at the stage of preparation, but theoretical lectures and preparation of drawings through OJT have been done.</p>	<p>See the Output-2 of Monitoring Sheet II</p>	
<p>3. A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2<sup>(*)</sup></p>	<p>3a. By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval                      3b. By October 2017, an annual NRW reduction plan (2018) is incorporated in FCTWB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval                      3c. A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project</p>		<p>Indicator will be obtained in Phase-2 of the Project scheduled in 2017 and 2018, but Working Group members were selected and existing plans and etc. were reviewed.</p>	<p>See the Output-3 of Monitoring Sheet II</p>	

Note<sup>(\*)</sup>: NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection  
 Note<sup>(\*)</sup>: A medium-term strategic plan is a five-year plan, which may include medium-term target, strategies and actions, timeframe, human resource requirement, on-the-job training mechanism, cost-benefit analysis of NRW reduction, etc. It is noted that NRW components addressed by the strategic plan are not limited to the ones mentioned in<sup>(\*)</sup> above; they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

Activities	The Nigerian Side	Inputs	The Japanese Side	Important Assumption
<p>1-1 Install bulk meters to water treatment plants 1 and 2</p> <p>1-2 Measure monthly water production of water treatment plants 1, 2, ,3, and 4</p> <p>1-3 Tally the above water production data monthly</p> <p>1-4 Calculate the monthly water consumption based on the billing data</p> <p>1-5 Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4</p>	<p><b>Project Personnel</b></p> <ol style="list-style-type: none"> <li>1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA</li> <li>2. Project Manager: Director of FCTWB</li> <li>3. Deputy Project Manager: HoD for Administration and Supply/FCTWB</li> <li>4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce/FCTWB</li> <li>5. Members of NRW Management Team (FCTWB):                     <ul style="list-style-type: none"> <li>- Head of Special Project Unit of Distribution Department (as Coordinator)</li> <li>- Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department</li> </ul> </li> <li>6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS)</li> <li>7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office</li> <li>8. Other personnel mutually agreed upon as necessary</li> </ol> <p><b>Land, Building and Facilities</b></p> <ol style="list-style-type: none"> <li>1. Office building and facilities necessary for the implementation of the Project</li> <li>2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each Pilot Area Office, including internet connection and air conditioners</li> <li>3. Other facilities mutually agreed upon as necessary</li> </ol> <p><b>Local Costs</b></p> <ol style="list-style-type: none"> <li>1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs</li> <li>2. Administration and operational costs, including costs for local travel for the Project Personnel</li> </ol>	<p><b>Project Personnel</b></p> <ol style="list-style-type: none"> <li>1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA</li> <li>2. Project Manager: Director of FCTWB</li> <li>3. Deputy Project Manager: HoD for Administration and Supply/FCTWB</li> <li>4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce/FCTWB</li> <li>5. Members of NRW Management Team (FCTWB):                     <ul style="list-style-type: none"> <li>- Head of Special Project Unit of Distribution Department (as Coordinator)</li> <li>- Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department</li> </ul> </li> <li>6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS)</li> <li>7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office</li> <li>8. Other personnel mutually agreed upon as necessary</li> </ol> <p><b>Land, Building and Facilities</b></p> <ol style="list-style-type: none"> <li>1. Office building and facilities necessary for the implementation of the Project</li> <li>2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each Pilot Area Office, including internet connection and air conditioners</li> <li>3. Other facilities mutually agreed upon as necessary</li> </ol> <p><b>Local Costs</b></p> <ol style="list-style-type: none"> <li>1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs</li> <li>2. Administration and operational costs, including costs for local travel for the Project Personnel</li> </ol>	<p><b>Japanese Experts</b></p> <ol style="list-style-type: none"> <li>1. Chief Advisor / NRW Reduction Planning</li> <li>2. Deputy Chief Advisor / NRW Reduction Planning</li> <li>3. NRW Reduction Operations Management</li> <li>4. Leakage Detection Technology</li> <li>5. Commercial Loss</li> <li>6. Hydraulic Analysis / GIS</li> <li>7. Procurement Management Coordinator</li> <li>8. Other experts mutually agreed upon as necessary</li> </ol> <p><b>Equipment</b></p> <ol style="list-style-type: none"> <li>1. Bulk meters for water treatment plants</li> <li>2. Water flow meters, valves, and customer meters for SMA</li> <li>3. Leakage detection equipment for PMA</li> <li>4. Pipe repair equipment for PMA</li> <li>5. Vehicles (Pick-ups)</li> <li>6. Other equipment mutually agreed upon as necessary</li> </ol> <p><b>Training of the Nigerian Project Personnel in Japan</b></p> <p>Four persons mutually agreed upon will be trained in Japan annually</p>	<p>▲ Natural disaster/political/instability/economic crisis that affect the project activities do not occur</p> <p><b>Pre-Conditions</b></p> <p>▲ Furnished offices for Japanese Expert Team are secured at Headquarters and each Pilot Area Office of FCTWB</p> <p>▲ Project Personnel is assigned with the finalized list</p>
<p>2-1 Review existing NRW reduction operations at each pilot Area Office</p> <p>2-2 Conduct capacity assessment of the relevant staff of each pilot Area Office</p> <p>2-3 Identify and select a Pilot Metering Area (PMA) for each pilot Area Office based on the selection criteria of PMA(*3)</p> <p>2-4 Prepare/update distribution network drawings for each PMA</p> <p>2-5 Install water flow meters to each PMA and measure in/outflows monthly</p> <p>2-6 Zone each PMA into Sub Metering Areas (SMA)</p> <p>2-7 Isolate a SMA by installing valves</p> <p>2-8 Update the distribution network drawings for each SMA</p> <p>2-9 Measure an initial level of NRW of each SMA</p> <p>2-10 Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA</p> <p>2-11 Develop a NRW reduction operation plan of each SMA, including reduction target, for review by Head of Distribution Department</p> <p>2-12 Review and approve NRW reduction operation plan of each SMA</p> <p>2-13 Implement the NRW reduction operations at each SMA</p> <p>2-14 Monitor the progress of the NRW reduction operations of each SMA</p> <p>2-15 Measure level of NRW of each SMA at the end of the respective operations</p> <p>2-16 Prepare a report on pilot projects, covering Activity 2-1~2-15</p> <p>2-17 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials</p>	<p>3-1 Establish a Working Group for NRW planning (*4)</p> <p>3-2 Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB</p> <p>3-3 Conduct hydraulic and water pressure distribution analyses of the pipeline networks</p> <p>3-4 Develop outlines of the medium-term strategic plan and its annual NRW reduction plan</p> <p>3-5 Develop the first medium-term strategic plan (2018-2022) for approval by FCTA</p> <p>3-6 Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA</p> <p>3-7 Develop a planning manual for NRW reduction</p>	<p>▲ Natural disaster/political/instability/economic crisis that affect the project activities do not occur</p> <p><b>Pre-Conditions</b></p> <p>▲ Furnished offices for Japanese Expert Team are secured at Headquarters and each Pilot Area Office of FCTWB</p> <p>▲ Project Personnel is assigned with the finalized list</p>	<p><b>Issues &amp; Countermeasures</b></p> <ul style="list-style-type: none"> <li>- Unstable power conditions in project office will be settled by provision of generator by JICA as an extra support.</li> <li>- Inadequate Counterpart Fund may cause further delay of project schedule. To avoid suspension, schedule and implementing procedures will be modified considering a current limited fund.</li> <li>- A large number of duplicated/return bills may have caused unreliable financial analysis including NRW. Fact will be clarified accurately and the bills will be treated properly by FCTWB, such as invalidation or elimination.</li> <li>- Smooth customs clearance and tax exemption of equipment to be imported from Japan will be ensured in close communication.</li> </ul>	<p>▲ Natural disaster/political/instability/economic crisis that affect the project activities do not occur</p> <p><b>Pre-Conditions</b></p> <p>▲ Furnished offices for Japanese Expert Team are secured at Headquarters and each Pilot Area Office of FCTWB</p> <p>▲ Project Personnel is assigned with the finalized list</p>

Note (\*3) Selection criteria of PMA are as follows: (i) Safety for night works is secured in measuring minimum night flow; (ii) Distribution network is separated and it is easy to isolate it in measuring NRW ratio; and (iii) NRW ratio is supposedly high.  
 Note (\*4) Working Group for NRW planning would consist of Project Manager (as chair), Deputy Project Manager, Technical Managers, Head of Finance Dept., Head of Production Dept., and members of NRW Management Team.

Project Monitoring Sheet II (Revision of Plan of Operation)  
Plan of Schedule and Actual Work Period

Activities	2015																																																Remarks	Achievement	Milestone																																																
	2015												2016												2017												2018																																																														
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep																																																			
<p><b>GOALS</b>                      1.1. Increase meters to water treatment plants (MTP) CTWB in monitoring regularly.                      1.2. Complete monthly monitoring water treatment dates (1, 3, 4 &amp; 4).                      1.3. Utilize the above water production consumption based on existing data.                      1.4. Calculate monthly water consumption based on existing data.                      1.5. Calculate monthly NRW ratio of the operation at each plant in the following table:                      Table 1                      Table 2                      Table 3                      Table 4                      Table 5                      Table 6                      Table 7                      Table 8                      Table 9                      Table 10                      Table 11                      Table 12                      Table 13                      Table 14</p> <p><b>GOALS</b>                      2.1. Review weekly NRW reduction operations of each plant in the Office of the Chief Executive Officer (CEO) organization and the relevant staff.                      2.2. Conduct capacity assessment of the plant and identify the relevant staff.                      2.3. Identify and select a Pilot Metering Area (PMA) for each Plant Area Office (PAO) for the NRW reduction program.                      2.4. Prepare and submit a network drawing for each PMA.                      2.5. Install water flow meters to each PMA and measure a breakdown monthly.                      2.6. Start each PMA on 30th January (SWA).                      2.7. Issue ISM by installing area change for each SWA.                      2.8. Update the distribution network drawing for each SWA.                      2.9. Measure an initial level of NRW at each SWA.                      2.10. Develop NRW components (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UU, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ.</p>																																																																																																			
<p><b>GOALS</b>                      3.1. Establish a Working Group for NRW reduction planning.                      3.2. Review existing data, instrumentation, structure, on-the-job training mechanism, etc. related to NRW.                      3.3. Conduct hydrologic water system distribution analysis of the plant area.                      3.4. Develop a plan and an annual NRW reduction plan for the plant area.                      3.5. Develop the first reduction plan (PMA) (2018-2022) to be approved by CEO.                      3.6. Develop an annual NRW reduction plan based on the strategic plan as an integral part of CTWB to be approved by CEO.                      3.7. Develop a plan manual for NRW reduction.</p>																																																	<p><i>(This section contains a detailed Gantt chart with yellow bars representing planned activities and grey bars representing actual work periods. It includes vertical lines for 'Presidential Election on 14th February' and 'Presidential Election on 28th March and State Election on 11th April'.)</i></p>																																																		
<p><b>Duration / Phasing</b></p>																																																	<p>WP (Working Period) / Actual (Actual Work Period) bars at the bottom of the grid, indicating the timing of various activities.</p>																																																		

Plan of Schedule and Actual Work Period

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project	2015												2016												2017												2018												2019												2020												2021																																																																							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec																																																												
<b>Inputs (the Japanese side)</b>	[Gantt chart showing project schedule with colored bars for various tasks across months from 2015 to 2021]																																																																																																																																															
<b>Equipment</b>	[Gantt chart showing equipment usage across months from 2015 to 2021]																																																																																																																																															
<b>Monitoring Plan</b>	[Gantt chart showing monitoring activities across months from 2015 to 2021]																																																																																																																																															
<b>Remarks</b>	[Text area for project remarks and observations]																																																																																																																																															

Version 1  
Date: 8 Nov 2021

Responsibility of Members

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project

Version Dated 1 6 Nov. 2014

Activities	Responsible Organization (Nigeria)	Responsible Person (Nigeria)	Implementors (Nigeria)	JICA Experts	Other Major Input		Remarks			
					Japan	Nigeria				
<b>Output-1</b>										
Level of NRW of the service area of FCTWB is monitored regularly	1-1	Install bulk meters to water treatment plants 1 and 2	W/P Revised Actual	Dist. Dpt	HoD(Pipeline)/D	Tech Officers (Pipeline)	CA, Dy,CA	Bulk meters	Installation, O&M cost	Prod Dpt will be consulted
	1-2	Measure monthly water production of water treatment plants 1, 2, 3, and 4	W/P Revised Actual	Dist. Dpt	HoU(Metering)/D	Tech Officers (Pipeline)	CA, Dy,CA			If bulks are installed inside the plants,
	1-3	Tally the above water production data monthly	W/P Revised Actual	Dist. Dpt	HoU(Prod)/Prod	Tech Officers (Prod)	CA, Dy,CA			Prod Dept shall measure.
	1-4	Calculate the monthly water consumption based on the billing data	W/P Revised Actual	Com Dpt	HoU(Billing)/C	Billing staff	CA, Dy,CA	customer software		
	1-5	Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4	W/P Revised Actual	Dist. Dpt	HoU(Logistics)/D	Logistics officer	CA, Dy,CA			
<b>Output-2</b>										
Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices	2-1	Review existing NRW reduction operations at each pilot Area Office	W/P Revised Actual	Dist. Dpt, Com. Dpt	HoD(Dist)(Com)	AM, AAM (Dist)(Com)	CA, Dy,CA, NRW reduction	Vehicles	O&M cost	
	2-2	Conduct capacity assessment of organization and the relevant staff	W/P Revised Actual	Dist. Dpt, Com. Dpt	HoD(Dist)(Com)	NRW Mgt Team	CA and other Experts			
	2-3	Identify and select a Pilot Metering Area (PMA) for each Pilot Area Office based on the selection criteria of PMA	W/P Revised Actual	Dist. Dpt, Com. Dpt	HoD(Dist)(Com)	NRW Mgt Team AM, AAM (Dist)(Com)	CA, Dy,CA, NRW reduction			
	2-4	Prepare/update distribution network drawings for each PMA	W/P Revised Actual	Dist. Dpt	HoD(Dist)	HoU(Logistics)&officers	NRW reduction,			
	2-5	Install water flow meters to each PMA and measure in/outflows monthly	W/P Revised Actual	Dist. Dpt	Area Manager(AM)	AAM(Dist)	NRW reduction,	Water flow meters	Installation and O&M cost	
	2-6	Zone each PMA into Sub Metering Areas (SMA)	W/P Revised Actual	Dist. Dpt	HoU(Logistics)/D	AM, AAM(Dist)(Com)	NRW reduction,			
	2-7	Isolate a SMA by installing valves	W/P Revised Actual	Dist. Dpt	AM	Tech Officers(Dist)	NRW reduction	Valves	Installation and O&M cost	
	2-8	Update the distribution network drawings for each SMA	W/P Revised Actual	Dist. Dpt	HoU(Logistics)/D	AAM(Dist), HoU(GIS)&officers	NRW reduction,			
	2-9	Measure an initial level of NRW of each SMA	W/P Revised Actual	Dist. Dpt	HoD(Dist)	HoU(Logistics)&officers	Hydraulic analysis			
	2-10	Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA	W/P Revised Actual	Dist. Dpt, Com. Dpt	AM		NRW reduction			
	2-11	Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of Distribution Department	W/P Revised Actual	Dist. Dpt	AM	AAM (Dist)(Com)	NRW reduction, Leakage detection, Com Loss			
	2-12	Review and approve NRW reduction operation plan of each SMA	W/P Revised Actual	Dist. Dpt	HoD(Dist)	Relevant HoUs	NRW reduction			
	2-13	Implement NRW reduction operations at each SMA	W/P Revised Actual	Dist. Dpt, Com. Dpt	AM		NRW reduction			
	2-14	Monitor the progress of the NRW reduction operations of each SMA	W/P Revised Actual	Area Office	AM		NRW reduction			
	2-15	Measure level of NRW of each SMA at the end of the respective operations	W/P Revised Actual	Area Office	AM		NRW reduction			
	2-16	Prepare a report on pilot projects, covering Activity 2-1-2-15	W/P Revised Actual	Dist. Dpt, Com. Dpt	HoD(Dist)(Com)	NRW Mgt Team, AM,	CA, Dy,CA, NRW reduction, Leakage detection, Com loss			
	2-17	Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials	W/P Revised Actual	Dist. Dpt, Com. Dpt	HoD(Dist)(Com)	NRW Mgt Team, AM, AAM (Dist)(Com)	CA, Dy,CA, NRW reduction, Leakage detection, Com loss Coordinator			
<b>Output-3</b>										
A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2	3-1	Establish a Working Group for NRW reduction planning	W/P Revised Actual	FCTWB	PM	Working Group	CA, Dy,CA, NRW reduction			
	3-2	Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB	W/P Revised Actual	FCTWB	PM	Working Group	CA, Dy,CA, NRW reduction			
	3-3	Conduct hydraulic and water pressure distribution analyses of the pipeline networks	W/P Revised Actual	Dist. Dpt	HoU(Logistics)/D	HoU(Logistics)&officers	Hydraulic analysis			
	3-4	Develop outlines of the medium-term strategic plan and its annual NRW reduction plan (approval by the Director)	W/P Revised Actual	FCTWB	PM	Working Group	CA, Dy,CA, NRW reduction			
	3-5	Develop the first medium-term strategic plan (2018-2022) for approval by FCTA	W/P Revised Actual	FCTWB	PM	Working Group	CA, Dy,CA, NRW reduction			
	3-6	Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA	W/P Revised Actual	FCTWB	PM	Working Group	CA, Dy,CA, NRW reduction			
	3-7	Develop a planning manual for NRW reduction	W/P Revised Actual	FCTWB	PM	Working Group	CA, Dy,CA, NRW reduction			
<b>Duration / Phasing</b>										



Project Monitoring Sheet II (Revision of Plan of Operation)

PM Form 3-3 Monitoring Sheet II

Responsibility of Members

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project

Version Dated 1 6 Nov. 2014

Inputs (the Japanese side)			Remarks							
<b>JICA Expert</b>										
1	Akinori MIYOSHI Chief Advisor / NRW Reduction Planning	W/P Revised Actual								
2	Taketoshi FUJIYAMA Deputy Chief Advisor / NRW Reduction Planning	W/P Revised Actual								
3	Toru TOYODA NRW Reduction Operations Management	W/P Revised Actual								
4	Kiyoshi KIYAMA Leakage Detection Technology	W/P Revised Actual								
5	Takaji OKUBO Commercial Loss	W/P Revised Actual								
6	Shinta SEGAWA Hydraulic Analysis / GIS	W/P Revised Actual								
7	Kazuhiro ISHIURA Procurement Management / Coordinator	W/P Revised Actual								
<b>Equipment</b>										
1	Leakage detection equipment *3PMAs in Japan (JICA)	W/P Revised Actual								
2	Bulk meters (ultrasonic flow meter) *WTP in Japan (JICA)	W/P Revised Actual								
3	Water meter, flow meter and valves *3PMAs in Nigeria (JICA Expert)	W/P Revised Actual								
4	Pipe repair equipment *3PMAs in Nigeria (JICA Expert)	W/P Revised Actual								
5	Vehicles (Pickup truck) *Leakage Detection in Nigeria (JICA)	W/P Revised Actual								
6	GIS software, office equipment *FCTWB HQs in Nigeria/Other (JICA Expert)	W/P Revised Actual								
<b>Local Consultant</b>										
1	Modification of billing and collection system	W/P Revised Actual								
2	GIS and database training	W/P Revised Actual								
<b>Training in Japan</b>										
		W/P Revised Actual								
<b>Monitoring Plan</b>			Responsible Organization (Nigeria)	Responsible Person (Nigeria)	Implementors (Nigeria)	JICA Experts	Other Major Input		Remarks	
							Japan	Nigeria		
<b>Planning, Monitoring and Coordination</b>										
1	Organize Joint Coordination Committee (JCC)	W/P Revised Actual	FCTWB	PM	Dy. PM	CA and other Experts				
2	Develop Detail Plan of Operations (DPO) for review and approval by JCC	W/P Revised Actual	FCTWB	PM	Dy. PM, NRW Mgt Team, AM	CA and other Experts				
3	Develop Annual Plan of Operations (APO) for review and approval by JCC	W/P Revised Actual	FCTWB	PM	Dy. PM, NRW Mgt Team, AM	CA and other Experts				
4	Organize monthly technical meetings	W/P Revised Actual	Dist. Dpt. Com. Dpt	NRW Mgt Team Coordinator	NRW Mgt Team, AM	CA and other Experts				
5	Organize quarterly project meetings	W/P Revised Actual	FCTWB	PM	Dy. PM, NRW Mgt Team, AM	CA and other Experts				
6	Conduct Joint Monitoring semi-annually	W/P Revised Actual	FCTWB	PM	Dy. PM, NRW Mgt Team, AM	CA and other Experts				
7	Submit Monitoring Sheet to JICA Nigeria Office semi-annually	W/P Revised Actual				CA, Dy.CA				
8	Monitoring Mission from JICA for Joint Review	W/P Revised Actual	JICA	JICA HQ	To be determined					
9	Organize information sharing seminars for FCTWB/FCTA, including Area Offices	W/P Revised Actual	FCTWB	PM	Dy.PM	CA and other Experts				
10	Collect and organize data for Indicators of PDM	W/P Revised Actual	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts				
a	Develop criteria for capacity assessment for each level of the relevant staff (i.e. members of NRW Mgmt and Action Teams)	W/P Revised Actual	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts				
b	Conduct joint capacity assessment of the relevant staff	W/P Revised Actual	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts				
c	Prepare Capacity Development (CD) Plan	W/P Revised Actual	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts				
d	Set reduction target for each PMA by the first quarter of the second year	W/P Revised Actual	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts				
e	Collect and organize for Indicators for semi-annual Joint Monitoring	W/P Revised Actual	Dist. Dpt. Com. Dpt	NRW Mgt Team's Coordinator	NRW Mgt Team, AM	CA and other Experts				
<b>Reports / Documents</b>										
11	Work Plan	W/P Revised Actual	FCTWB	PM	Dy. PM, NRW Mgt Team					
12	Project Progress Report	W/P Revised Actual	FCTWB	PM	Dy. PM, NRW Mgt Team					
13	Project Completion Report	W/P Revised Actual	FCTWB	PM	Dy. PM, NRW Mgt Team	CA and other Experts				
<b>Public Relations</b>										
14	Develop Project Website	W/P Revised Actual	FCTWB	PM	NRW Mgt Team, HoU(PR)	CA, Dy.CA, Coordinator				
15	Preparation of public relations materials	W/P Revised Actual	FCTWB	PM	NRW Mgt Team, HoU(PR)	CA, Dy.CA, Coordinator				Public Relation Unit under Director(PM) will collaborate
<b>Monitoring and Evaluation in the Post-Project period</b>										
16	Post Monitoring by JICA (not described here)		JICA							
17	Post Evaluation by JICA (not described here)		JICA							

**Project Members List**

June 2015

Photos	Names	Positions	Phones / Mail Addresses / Remarks
	Mr. Abubakar Sami Pai * Joined in 2015	Director of EPRS, FCTA (Acting)	
	Project Director Mr. Hudu Bello	Director of FCTWB	<i>Water Supply Administration for Better Management of Water Supply Services (2015)</i>
	Project Manager Mr. S.T. Bello	Head of Administration and Supply Department, CTWB	<i>Water Supply Administration for Better Management of Water Supply Services (2014)</i>
	Engr. A. A. Nahuche	Head of Distribution Department, FCTWB	<i>Trainee-to-be for Water Supply Services Management and NRW Reduction in Aug. 2015</i>
	Technical Manager Mr. Adis S. Muhammad	Head of Commerce Department, FCTWB	<i>Trainee-to-be for Water Supply Services Management and NRW Reduction in Aug. 2015</i>
	Technical Manager Haifasat Ahmed Lawi	Head of Finance and Account Department	
	Aliyu Usman	Head of Reservoir and Production Department	<i>Trainee-to-be for Water Supply Services Management and NRW Reduction in Aug. 2015</i>












**Project Members List**

June 2015

Photos	Names	Positions	Phones / Mail Addresses / Remarks
	Bunmi Olowookere	Head of Planning, Research and Statistics Unit	<i>Water Supply Administration for Better Management of Water Supply Services (2013)</i>
	Abbas A. Ahmed	Head of Public Relations Unit	
	Vincent Obich	Head of MIS Unit	
<b>NRW Management Team</b>			
<b>Distribution Department</b>			
	Abolade R. Lawal	Head of Special Projects Unit	
	Coordinator Moh. Kabir Rabiu	Head of Logistics Unit	<i>O&amp;M of Urban Water Supply System (Water Distribution and Services) (2012)</i>
	Musa Dikko	Head of Pipeline Unit	<i>Trainee-to-be for Water Supply Services Management and NRW Reduction in Aug. 2015</i>
	Shehu Suleiman	Head of GS Unit	

**Project Members List**

June 2015

Photos	Names	Positions	Phones / Mail Addresses / Remarks
	Douglas E. Oloton	Head of Metering General	 O&M of Urban Water Supply System (Water Distribution and Services) (2015)
	A. O. Akande	Head of Metering Unit (AMR Meter)	
	Yetunda Olaniyan	Head of Water Monitoring Unit	 Non-Revenue Water Management (Leakage Control) (2014)
	Abdullahi Masaud	Head of Metering Unit (Pre-paid Meter)	 O&M of Urban Water Supply System (Water Distribution and Services) (2012)
	Abubakar Ubale Abuba	Civil Engr. II, Logistics Unit	 Comprehensive Engineering on Water Supply System (2013)
	Mohammed Dauda	Technical Officer, Pipeline Unit	
	Ezeh Hilary	Surveyor, GIS Unit	








**Project Members List**

June 2015

Photos	Names	Positions	Phones / Mail Addresses / Remarks
<b>Commerce Department</b>			
	Issac O. Owolabi	Head of Customer Care Unit	
	Danjuma Isah	Head of Monitoring and Detection Unit	
	Taiwo Adeyemi	Monitoring staff, Monitoring and Detection Unit	
	Aliyu Maradun	Head of Major Consumers Unit	
	Rose Akpan	Head of Billing Unit	
	Suleman Agbawn	Billing Officer, Billing Unit	
<b>Administration and Supply Department</b>			
	Francisca Samuel	Head of Training / Welfare Unit	








**Project Members List**

June 2015

Photos	Names	Positions	Phones / Mail Addresses / Remarks
	Akudike Ike D.	Head, Facility Management Unit	
<b>NRW Action Team</b>			
<b>Jabi Area Office</b>			
	Muhammed A. S. Ramat	Area Manager (Distribution)	
	Team Leader Sadiq Salihu	Assistant Area Manager (Distribution)	
	Abawonse J. K.	Assistant Area Manager (Commerce)	
	Jummai Ugobodaga	Senior Commercial Officer (Commerce)	
	Mohammed Moh'd	Planning Officer (Commerce)	
	Aliyu Ibrahim	Senior Works Superintendent (Distribution)	

**Project Members List**

June 2015

Photos	Names	Positions	Phones / Mail Addresses / Remarks
	Abubakar Danladi	Foreman (Distribution)	
	Raliat Zubairu	Higher Trade Officer (Commerce)	
	Mahmud Muhammed	Foreman (Distribution)	
	Hassan Yelwa	STA (Commerce)	
<b>Gudu Area Office</b>			
	Habib Ahmed Kiru * Joined in 2015	Area Manager (Distribution)	
	Team Leader Ogbu O. Williams	Assistant Area Manager (Commerce)	
	Abdul Ozumi	Assistant Area Manager (Distribution)	

**Project Members List**

June 2015

Photos	Names	Positions	Phones / Mail Addresses / Remarks
	Adamu Ismaila	Unit Head (Commerce)	
	Umar I. Adamu	Assistant Tech. Officer (Commerce)	
	Kotangora Mohammed	Assistant Unit Head (Distribution)	
	Salisu Mohammed	Plumber (Distribution)	
<b>Garki I Area Office</b>			
	Adesoji Adenuga	Area Manager (Commerce)	 Capacity Development for Flood Risk Management with IFAS (2014)
	Choji Pam * Joined in 2015	Assistant Area Manager (Commerce)	
	Mohammed Gana	Assistant Area Manager (Distribution)	




**Project Members List**




June 2015

Photos	Names	Positions	Phones / Mail Addresses / Remarks
	Olusegun Rose	Senior Trade Officer (Commerce)	
	Abdulahi Ibrahim	Assistant Tech. Officer (Commerce)	
	Iliya Galadima	Higher Works Super Intendant (Distribution)	
	Raymond Olowookere	Forman (Distribution)	
	Ibrahim Yelwa	Forman (Distribution)	
	Hassan Abubakar	Commerce Officer (Commerce)	
	Shehu Isa	Craftsman (Distribution)	

**Project Members List**

June 2015

Photos	Names	Positions	Phones / Mail Addresses / Remarks
<b>Additional Members</b>			
	Aliyu S. Muazu	Assistant Director / Assistant Head (Commerce)	
	Coordinator for Commerce Members		
	Muminu Adekunle Raifu	Assistant Area Manager (Structure Engr.)	 African Region Urban Waterworks Engineering (201#)

Photos	Names	Positions	Phones / Mail Addresses / Remarks
<b>Former Project Members</b>			
	Mr. Ari, Isa Muhammad	Director of EPRS, FCTA	
	Project Director Abdurahaman U. Sanda	Area Manager (Distribution)	
	Previous Team Leader Umar Ibrahim	Assistant Area Manager (Commerce)	

To Chief Representative of JICA Nigeria Office

## PROJECT MONITORING SHEETS

**Project Title : The Federal Capital Territory Reduction of Non-Revenue Water Project**

**Version of the Sheet: Ver. 2 (Term covered: July, 2015 - October, 2015)**

**Name: Akinori Miyoshi**

**Title: Chief Advisor**

**Submission Date: 12 November 2015**

### I. Summary

#### 1 Progress

##### 1-1 Progress of Inputs

###### **[The Nigerian Side]**

All project members including Project Director, Project Manager, Deputy Project Manager, Technical Managers, Non-Revenue Water (NRW) Management Team members, NRW Action Team members confirmed his/her roles and responsibilities and have been involved in the Project since the beginning of the Project. But, during this monitoring period, a member of Action Team in Gudu pilot Area Office, an assistant trade officer has been moved to other Area Office, which should be rectified by FCTWB.

All necessary arrangement and documentation including tax exemption for equipment from Japan were done by Federal Capital Territory Administration (FCTA) and Federal Capital Territory Water Board (FCTWB).

Chambers for flow meters and valves for the selected PMAs/SMAs have been procured, and construction will commence in the beginning of November 2015.

###### **[The Japanese Side]**

As at the end of October 2015, Japan International Cooperation Agency (JICA) Expert Team consisting of a Chief Advisor and six members have been assigned to the works in Nigeria for 20 man-months from November 2014, except for most of the period from January to April 2015 (2015 General Election in Nigeria).

The Japanese side has procured office equipment, vehicles, flow meters and valves for the selected PMAs/SMAs locally in Nigeria, and also equipment from Japan such as bulk (ultrasonic) meter and leakage detector, which were delivered to FCTWB. See the Annex-1: List of the procured Equipment for the Project.

The first training of the following four Nigerian project personnel in Yokohama City, Japan was conducted in the period between 17<sup>th</sup> and 28<sup>th</sup> August 2015. See the Annex-2: Training Programme.

- Engr. A. A. Nahuche, Head of Department (HOD) Distribution
- Mr. Adis S. Muhammad, HOD Commerce
- Engr. Aliyu Usman, HOD Reservoir and Production
- Mr. Musa Dikko, Head of Pipeline Unit, Distribution

### **1-2 Progress of Activities**

#### **[Activities for Output-1: Level of NRW of the service area of FCTWB is monitored regularly.]**

Activity 1-1: Four bulk flow meters (ultrasonic) and data logger have been procured and delivered to FCTWB by JICA. Procurement process of chamber construction is ongoing, but actual works has been suspended due to dearth of Counterpart Fund of FCTWB for implementation.

Activity 1-4: Duplicated/returned bills have been identified by all Area Offices and corresponding Units of Headquarters, and forwarded to the Committee assigned to update the records. However, the data has not yet been shared with JICA Expert Team for analysis of information related to NRW.

#### **[Activities for Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

Activity 2-4: Two PCs and GIS software were handed over to FCTWB. The software has been set installed into PCs. Distribution network drawings for Gudu Area Office have been completed, while Jabi and Garki I are ongoing.

Activity 2-5 to 2-7: PMAs/SMAs have been designed prior to their physical creation and NRW reduction operations. See the Annex-3: Location of Chambers for Flow Meter/Valves in each PMA.

Activity 2-5 and 2-7: Verification of pipe size and materials has been conducted in all three PMAs. Similarly excavation for installation of flow meters, valves and construction of chambers is to commence in Gudu by FCTWB in the beginning of November 2015. JICA Expert Team has procured materials (flow meters, valves and fittings) for Gudu and Jabi, while procurement of materials for Garki I is ongoing.

Activity 2-10: Collection of baseline data related to commercial loss such as water consumption of customers domiciled in the selected PMAs/SMAs is ongoing, however the progress is slow due to certain challenges, multiple billing, estimated billing, different kind of meters installed, etc. Acceleration of the data collection is crucial to avoid delay of the other activities following this.

#### **[Activities for Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**



No activities as planned in this period.

### 1-3 Achievement of Output

#### **[Output-1: Level of NRW of the service area of FCTWB is monitored regularly.]**

**Indicator:** 1a: Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first year of the Project

1b: Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the first year of the Project.

1c: Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors of FCTWB from the third quarter of the first year of the Project.

Current Status: Significant progress / On track / Little progress / Delayed / To be revised,

\* As stated in Section 2-1 Detail, 2 Delay of Work Schedule and/or Problems (if any), necessary data cannot be measured due to delay of activities, but actions have been taken.

Target Date of Achievement: Indicator 1a&1b will be obtained from April 2016, Indicator 1c from October 2016.

#### **[Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

**Indicator:** 2a: Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations.

2b: Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project.

Current Status: Significant progress / On track / Little progress / Delayed / To be revised,

\* As stated in Section 2-1 Detail, 2 Delay of Work Schedule and/or Problems (if any), necessary data cannot be measured due to delay of activities, but actions have been taken, and theoretical lectures and preparation of drawings through OJT have been done.

Target Date of Achievement: Indicator 2a will be obtained from November 2016, Indicator 2b from June 2016.

#### **[Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

**Indicator:** 3a: By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval.

3b: By October 2017, an annual NRW reduction plan (2018) is incorporated in

FCWTB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval.

3c: A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project.

Indicator will be obtained in Phase-2 of the Project scheduled in 2017 and 2018, but Working Group members were selected and existing plans, etc. related to NRW reduction at FCTWB were reviewed preliminarily.

#### **1-4 Achievement of the Project Purpose**

##### **[Project Purpose: Capacity of FCTWB for NRW reduction is strengthened.]**

**Indicator:** a: The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.

b: NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB.

c: Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level.

d: NRW ratio of each PMA in the last quarter of the Project reaches its respective target (\*\*).

Note(\*\*): Target for each PMA is expected to be determined by the end of the first quarter of the second year

Indicator cannot be obtained because of limited progress, but skills and knowledge necessary for NRW reduction has been gradually developed through lectures, OJT and the first counterpart training in August 2015 in Japan.

#### **1-5 Changes of Risks and Actions for Mitigation**

Release of the additional approved Counterpart Fund is hampered by the new government policy, namely Treasury Single Account (TSA).

Inadequate power supply and time-consuming procedures for custom clearance / tax exemption, which were captured in the previous project monitoring sheet, have been solved.

#### **1-6 Progress of Actions undertaken by JICA**

Equipment from Japan such as ultrasonic flow meter and leakage detector were procured and delivered to FCTWB by JICA. JICA provided necessary information to FCTWB in a timely manner for smooth customs clearance and tax exemption.

As mentioned in Section 1-1, Progress of Inputs, office equipment (PCs, printer, copier and etc.) and GIS software were handed over to FCTWB. Two vehicles (Toyota Hilux 4WD) and materials for pilot project implementation (flow meters, valves and fittings) have been procured and delivered to FCTWB, except that of Garki I..

JICA Expert Team issued procurement notice to consulting firms for GIS training, while the procurement of consultant for modification of billing system has been suspended due to issues of duplicated/returned bills.

The first batch of the Nigerian project personnel was trained in Japan by JICA in August 2015.

### **1-7 Progress of Actions undertaken by Nigerian side**

Customs clearance and tax exemption were obtained by FCTWB which facilitated clearance of tools and equipment procured by JICA from Japan.

FCTWB secured the approval of 2015 Counterpart Fund for the Project. Timely release of the Fund was hampered by the government policy of TSA.

Adequate security was provided to JICA Expert Team in the field. Issue of identification card is in progress.

As mentioned in Section 1-1, Progress of Inputs, office spaces and necessary facilities including internet connection for JICA Expert Team have been provided in FCTWB Headquarters, but those in pilot Area Offices is still been in preparation.

### **1-8 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)**

Absence of legal instrument (enabling law) establishing FCTWB.

## **2 Delay of Work Schedule and/or Problems (if any)**

### **2-1 Detail**

#### **(1) Limited Progress of Activities for Output-1**

Activities for Output-1 have been delayed or postponed, particularly Activity 1-1 related to bulk flow meter installation at outlet of water treatment plant, followed by Activity 1-2 and 1-5.

On the other hand, activities for Output-2, particularly Activity 2-5 and 2-7 related to PMA/SMA physical creation by installing flow meters and valves in pilot projects, which were regarded as delayed in the previous monitoring, has been addressed and progressing.

**(2) Suspension of Activity 1-4**

Activity 1-4 for modification of billing system has been suspended due to duplicated/returned bills. It may have caused unreliable financial analysis including NRW and therefore needs to be solved prior to the modification of billing system.

**(3) Delay in implementing Activity 2-5 and 2-7**

Procurement of flow meters and valves in Activity 2-5 and 2-7 has been delayed due to non-existence of as-built drawings in FCTWB, but pipe size and materials have been identified by physical verification.

**(4) AGIS Security Administrative Password**

Policy of Abuja Geographical Information System (AGIS) on data restriction has hindered the use of AGIS data by the Project.

**2-2 Cause**

**(1) Limited Progress of Activities for Outut-1**

Insufficient 2015 Counterpart Fund has caused this. Request of 2015 Counterpart Fund to be allocated to activities for Output-1 was approved by FCTA, but its release has been hampered by the new government policy of TSA.

**(2) Suspension of Activity 1-4**

Existing duplicated/returned bills have caused this. FCTWB has not been able to completely and effectively treat duplicated/returned bills.

**(3) Delay in implementing Activity 2-5 and 2-7**

Non-existence of as-built drawings has caused this. As-built drawings are supposed to be handed over to FCTWB, but actually it has not been done appropriately. There is lack of information sharing among relevant departments and other infrastructural developer such as mass housing estate developer.

**(4) AGIS Security Administrative Password**

This is the policy of AGIS.

**2-3 Action to be taken**

**(1) Limited Progress of Activities for Outut-1**

FCTWB will liaise closely with FCTA for quick release of Counterpart Fund as soon as the government policy of TSA is stabilized.

**(2) Suspension of Activity 1-4**

FCTWB collated all the duplicated/returned bills, verified them and commenced the deactivation process for the bills. Report will be submitted by the middle of November 2015 to JICA Expert Team to analyze them jointly for water balance. After the deactivation and analysis, water

connection and data creation will be centralized by HODs (Distribution and Commerce) in the Headquarters to avoid duplication.

**(3) Delay in implementing Activity 2-5 and 2-7**

FCTWB, particularly GIS Unit and Pipeline Unit, will update GIS network drawings by physical verification during routine maintenance and capture GPS location for existing facilities. FCTWB will obtain as-built drawings of new/old facilities certainly from FCDA's Engineering Services Department and FCT Agency for Mass Housing.

**(4) AGIS Security Administrative Password**

FCTWB will gradually develop its own customized GIS database.

**2-4 Roles of Responsible Persons/Organization**

**[FCTWB]**

- Liaison with FCTA for quick release of Counterpart Fund: Director of FCTWB and HOD Finance
- Update of GIS database for distribution network (ongoing): GIS Unit, Pipeline Unit and Area Offices
- Reconfirmation of pipe size and material where valves will be installed (ongoing): Pipeline Unit and pilot Area Offices under supervision of Head of Department (HOD) Distribution.
- Procurement/construction of valve casings/chambers and supervision (ongoing): Pipeline Unit, Logistics Unit and Unit in charge of procurement under supervision of HOD Administration & Supply and HOD Distribution.
- Forming a committee for duplicated/returned bills (completed): HOD Commerce.
- Deactivation of duplicated/returned bills (ongoing): relevant units and all Area Offices under supervision of HOD Commerce.
- Analysis of collected information of duplicated/returned bills for water balance: Monitoring and Detection Unit under supervision of HOD Commerce.

**[JICA Expert Team]**

- Support to confirmation of pipe size and material where valves will be installed (ongoing).
- Support to preparation and procurement (completed) and construction of valve casings/chambers (ongoing).
- Procurement of valves and fittings (ongoing).
- Procurement of GIS training (ongoing)
- Support to analysis of duplicated/returned bills for water balance.
- Procurement of modification of billing system

**3 Modification of the Project Implementation Plan**

**3-1 Plan of Operation**

Due to the above problems and other reasons, Plan of Operation (PO) has been rescheduled. See the Project Monitoring Sheet II as attached.

**3-2 Other modifications on detailed implementation plan**

(Remarks: The amendment of R/D and PDM (title of the project, duration, project site(s), target group(s), implementation structure, overall goal, project purpose, outputs, activities, and input) should be authorized by JICA HQ. If the project team deems it necessary to modify any part of R/D and PDM, the team may propose the draft.)

Based on the recognition between JICA and FCTWB, JICA made the decision to enhance the Project through additional activities such as installation of zonal meters and establishment of framework of water distribution management. Accordingly, PDM will be revised in the third Joint Coordinating Committee (JCC) meeting.

**4 Preparation by Nigerian side toward after completion of the Project**

To be considered.

**II. Project Monitoring Sheet I & II (as attached)**

**Annex**

Annex-1: List of the procured Equipment for the Project

Annex-2: Training Programme (1<sup>st</sup> Training in August 2015)

Annex-3: Location of Chambers for Flow Meter/Valves in each PMA (Plan)

**Project Monitoring Sheet I (Revision of Project Design Matrix)**

**PDM<sub>1</sub>**

**Project Title:** The Federal Capital Territory Reduction of Non-Revenue Water Project  
**Project Period:** October 2014 to March 2018  
**Implementing Organization:** Federal Capital Territory Administration (FCTA) / Federal Capital Territory Water Board (FCTWB)  
**Direct Beneficiaries:** FCTWB, relevant staff of FCTWB Headquarters and pilot Area Offices  
**Project Site:** FCT

Version 1  
 Dated 6 Nov. 2014

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<p>&lt;Overall Goal&gt;                      Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB</p>	<p>a. Annual NRW ratio is reduced to X%<sup>(*)</sup> at the end of the year 2021</p> <p>Note<sup>(*)</sup>: Target value (X%), which is expected to be determined in the medium-term strategic plan for NRW reduction, shall be tentatively filled when the final draft was approved by the Director of FCTWB, which shall be finalized when the plan is approved by FCTA</p>	<p>a. Record of NRW ratio kept by Distribution Department</p>	<p>Indicator cannot be obtained because of limited progress.</p>	<p>See the Output-2 of Monitoring Sheet II</p>	
<p>&lt;Project Purpose&gt;                      Capacity of FCTWB for NRW reduction is strengthened</p>	<p>a. The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.                      b. NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB                      c. Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level                      d. NRW ratio of each PMA in the last quarter of the Project reaches its respective target<sup>(**)</sup></p> <p>Note<sup>(**)</sup>: Target for each PMA is expected to be determined by the end of the first quarter of the second year</p>	<p>a. Date of approval of the plan                      b. Result of monitoring by NRW Management Team                      c. Results of joint assessment based on the criteria set by the Project                      d. Record of NRW ratio kept by Distribution Department</p>	<p>A. Policy support for NRW reduction is not discontinued                      B. Natural disaster/ political instability/ economic crisis that affect the service area of FCTWB do not occur                      C. Activities to implement the medium-term strategic plan are not discontinued or delayed</p>	<p>Indicator cannot be obtained because of limited progress, but skills and knowledge necessary for NRW reduction has been gradually developed through lectures, OJT and the first counterpart training in August 2015 in Japan.</p>	<p>See the Output-2 of Monitoring Sheet II</p>
<p>Annex 1                      Level of NRW of the service area of FCTWB is monitored regularly</p>	<p>a. Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first year of the Project                      b. Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the first year of the Project                      c. Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors of FCTWB from the third quarter of the first year of the Project                      d. Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations                      e. Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project</p>	<p>1a. Monthly record of NRW ratio.                      1b&amp;1c. Material for meetings submitted by the Distribution Department                      2a. Record of NRW ratio kept by the Distribution Department                      2b. Date of approval of the manuals                      3a&amp;3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan                      3c. Date of approval of the manual</p>	<p>A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers</p>	<p>Necessary data cannot be measured due to delay of activities, but actions have been taken.</p>	<p>See the Output-1 of Monitoring Sheet II</p>
<p>2. Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices<sup>(*)</sup></p>	<p>3a. By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval                      3b. By October 2017, an annual NRW reduction plan (2018) is incorporated in FCTWB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval                      3c. A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project</p>	<p>3a&amp;3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan                      3c. Date of approval of the manual</p>	<p>Necessary data cannot be measured due to delay of activities, but actions have been taken, and theoretical lectures and preparation of drawings through OJT have been done.</p>	<p>See the Output-2 of Monitoring Sheet II</p>	<p>See the Output-3 of Monitoring Sheet II</p>
<p>3. A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2<sup>(*)</sup></p>	<p>Note<sup>(*)</sup>: NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection                      Note<sup>(2)</sup>: A medium-term strategic plan is a five-year plan, which may include medium-term target, strategies and actions, timeframe, human resource requirement, on-the-job training mechanism, cost-benefit analysis of NRW reduction, etc. It is noted that NRW components addressed by the strategic plan are not limited to the ones mentioned in<sup>(*)</sup> above; they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).</p>	<p>Indicator will be obtained in Phase-2 of the Project scheduled in 2017 and 2018, but Working Group members were selected and existing plans, etc. related to NRW reduction at FCTWB were reviewed preliminarily.</p>	<p>Indicator will be obtained in Phase-2 of the Project scheduled in 2017 and 2018, but Working Group members were selected and existing plans, etc. related to NRW reduction at FCTWB were reviewed preliminarily.</p>	<p>Indicator will be obtained in Phase-2 of the Project scheduled in 2017 and 2018, but Working Group members were selected and existing plans, etc. related to NRW reduction at FCTWB were reviewed preliminarily.</p>	<p>Indicator will be obtained in Phase-2 of the Project scheduled in 2017 and 2018, but Working Group members were selected and existing plans, etc. related to NRW reduction at FCTWB were reviewed preliminarily.</p>

Note<sup>(\*)</sup>: NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection  
 Note<sup>(2)</sup>: A medium-term strategic plan is a five-year plan, which may include medium-term target, strategies and actions, timeframe, human resource requirement, on-the-job training mechanism, cost-benefit analysis of NRW reduction, etc. It is noted that NRW components addressed by the strategic plan are not limited to the ones mentioned in<sup>(\*)</sup> above; they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

Activities	Inputs	The Japanese Side	Important Assumption
<p>1-1 Install bulk meters to water treatment plants 1 and 2</p> <p>1-2 Measure monthly water production of water treatment plants 1, 2, 3, and 4</p> <p>1-3 Tally the above water production data monthly</p> <p>1-4 Calculate the monthly water consumption based on the billing data</p> <p>1-5 Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4</p>	<p><b>The Nigerian Side</b></p> <p><b>Project Personnel</b></p> <ol style="list-style-type: none"> <li>1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA</li> <li>2. Project Manager: Director of FCTWB</li> <li>3. Deputy Project Manager: HoD for Administration and Supply/FCTWB</li> <li>4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce/FCTWB</li> <li>5. Members of NRW Management Team (FCTWB):                     <ul style="list-style-type: none"> <li>- Head of Special Project Unit of Distribution Department (as Coordinator)</li> <li>- Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department</li> </ul> </li> <li>6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS)</li> <li>7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office</li> <li>8. Other personnel mutually agreed upon as necessary</li> </ol> <p><b>Land, Building and Facilities</b></p> <ol style="list-style-type: none"> <li>1. Office building and facilities necessary for the implementation of the Project</li> <li>2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each Pilot Area Office, including internet connection and air conditioners</li> <li>3. Other facilities mutually agreed upon as necessary</li> </ol> <p><b>Local Costs</b></p> <ol style="list-style-type: none"> <li>1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs</li> <li>2. Administration and operational costs, including costs for local travel for the Project Personnel</li> </ol>	<p><b>The Japanese Side</b></p> <p><b>Japanese Experts</b></p> <ol style="list-style-type: none"> <li>1. Chief Advisor / NRW Reduction Planning</li> <li>2. Deputy Chief Advisor / NRW Reduction Planning</li> <li>3. NRW Reduction Operations Management</li> <li>4. Leakage Detection Technology</li> <li>5. Commercial Loss</li> <li>6. Hydraulic Analysis / GIS</li> <li>7. Procurement Management Coordinator</li> <li>8. Other experts mutually agreed upon as necessary</li> </ol> <p><b>Equipment</b></p> <ol style="list-style-type: none"> <li>1. Bulk meters for water treatment plants</li> <li>2. Water flow meters, valves, and customer meters for SMA</li> <li>3. Leakage detection equipment for PMA</li> <li>4. Pipe repair equipment for PMA</li> <li>5. Vehicles (Pick-ups)</li> <li>6. Other equipment mutually agreed upon as necessary</li> </ol> <p><b>Training of the Nigerian Project Personnel in Japan</b></p> <p>Four persons mutually agreed upon will be trained in Japan annually</p>	<p><b>Important Assumption</b></p> <p>A Natural disaster/political/instability/economic crisis that affect the project activities do not occur</p> <p><b>Pre-Conditions</b></p> <p>A Furnished offices for Japanese Expert Team are secured at Headquarters and each Pilot Area Office of FCTWB</p> <p>B Project Personnel is assigned with the finalized list</p>
<p>2-1 Review existing NRW reduction operations at each pilot Area Office</p> <p>2-2 Conduct capacity assessment of the relevant staff of each pilot Area Office</p> <p>2-3 Identify and select a Pilot Metering Area (PMA) for each pilot Area Office based on the selection criteria of PMA(*3)</p> <p>2-4 Prepare/update distribution network drawings for each PMA</p> <p>2-5 Install water flow meters to each PMA and measure in/outflows monthly</p> <p>2-6 Zone each PMA into Sub Metering Areas (SMA)</p>	<p>2-7 Isolate a SMA by installing valves</p> <p>2-8 Update the distribution network drawings for each SMA</p> <p>2-9 Measure an initial level of NRW of each SMA</p> <p>2-10 Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA</p> <p>2-11 Develop a NRW reduction operation plan of each SMA, including reduction target, for review by Head of Distribution Department</p> <p>2-12 Review and approve NRW reduction operation plan of each SMA</p> <p>2-13 Implement the NRW reduction operations at each SMA</p> <p>2-14 Monitor the progress of the NRW reduction operations of each SMA</p> <p>2-15 Measure level of NRW of each SMA at the end of the respective operations</p>	<p><b>Equipment</b></p> <ol style="list-style-type: none"> <li>1. Bulk meters for water treatment plants</li> <li>2. Water flow meters, valves, and customer meters for SMA</li> <li>3. Leakage detection equipment for PMA</li> <li>4. Pipe repair equipment for PMA</li> <li>5. Vehicles (Pick-ups)</li> <li>6. Other equipment mutually agreed upon as necessary</li> </ol>	<p><b>Issues &amp; Countermeasures</b></p> <ul style="list-style-type: none"> <li>- Insufficient 2015 Counterpart Fund has caused limited progress of activities for Output-1. FCTWB will liaise closely with FCTA for quick release of the Fund as soon as the government policy of TSA is stabilized.</li> <li>- Existing duplicated/returned bills have caused suspension of Activity 1-4. FCTWB collated all the duplicated/returned bills, verified them and commenced the deactivation process for the bills. Report will be submitted by the middle of November 2015 to JICA Expert Team to analyze them jointly for water balance.</li> <li>- Non-existence of as-built drawings has caused delay in implementing Activity 2-5 and 2-7. FCTWB will update GIS network drawings by physical verification during routine maintenance and capture GPS locations for existing facilities. FCTWB will obtain as-built drawings of new/old facilities certainly from FCDA's Engineering Services Department and FCT Agency for Mass Housing.</li> <li>- Policy of Abuja Geographical Information System (AGIS) on data restriction has hindered the use of AGIS data by the Project. FCTWB will gradually develop its own customized GIS database.</li> </ul>
<p>2-16 Prepare a report on pilot projects, covering Activity 2-1~2-15</p> <p>2-17 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials</p>	<p>3-1 Establish a Working Group for NRW planning (*4)</p> <p>3-2 Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB</p> <p>3-3 Conduct hydraulic and water pressure distribution analyses of the pipeline networks</p> <p>3-4 Develop outlines of the medium-term strategic plan and its annual NRW reduction plan</p> <p>3-5 Develop the first medium-term strategic plan (2018-2022) for approval by FCTA</p> <p>3-6 Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA</p> <p>3-7 Develop a planning manual for NRW reduction</p>		

Note (\*3) Selection criteria of PMA are as follows: (i) Safety for night works is secured in measuring minimum night flow; (ii) Distribution network is separated and it is easy to isolate it in measuring NRW ratio; and (iii) NRW ratio is supposedly high.

Note (\*4) Working Group for NRW planning would consist of Project Manager (as chair), Deputy Project Manager, Technical Managers, Head of Finance Dept., Head of Production Dept., and members of NRW Management Team.



Project Monitoring Sheet II (Revision of Plan of Operation)

Activities		2015												2016												2017		Milestones	Achievement	Remarks	Version Date				
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov					Dec			
<b>2015</b>																													1	Nov 2015					
<b>2016</b>																													1	Nov 2016					
<b>2017</b>																													1	Nov 2017					
1.1	Finalize meters to water treatment plant's flow CTWB in monitoring regularly	WP	Actual																															Completion has been postponed due to inadequate flow meter. Bld were waiting for the release of the final.	
1.2	Complete monthly flow meter calibration	WP	Actual																															Calibration has been postponed due to inadequate flow meter. Bld were waiting for the release of the final.	
1.3	Hold flow above procedure	WP	Actual																															Station of filling and its equipment are being partially assessed.	
1.4	Calculate monthly water consumption based on the billing data	WP	Actual																															Station of filling and its equipment are being partially assessed.	
1.5	Calculate monthly NRW rate of the production water	WP	Actual																															Station of filling and its equipment are being partially assessed.	
<b>2017</b>																													1	Nov 2017					
<b>2018</b>																													1	Nov 2018					
<b>2019</b>																													1	Nov 2019					
2.1	Review weekly NRW reduction operations at each PWA in the O&M	WP	Actual																															Reviewing the O&M of each PWA. No actual data recorded as yet.	
2.2	Conduct capacity assessment of the organization and the relevant staff	WP	Actual																															Capacity assessment is ongoing.	
2.3	Identify and select a Pilot Monitoring Area (PMA) for each PWA in O&M	WP	Actual																															Identification of PMA is ongoing.	
2.4	Propagate the distribution network drawing for each PMA	WP	Actual																															Network drawing is ongoing.	
2.5	Install water flow meters to each PMA and measure a breakdown monthly	WP	Actual																															Flow meter installation is ongoing.	
2.6	Store each PMA flow data monthly	WP	Actual																															Flow meter installation is ongoing.	
2.7	Issue SMS by existing SMS	WP	Actual																															Flow meter installation is ongoing.	
2.8	Update the distribution network drawing for each PMA	WP	Actual																															Network drawing is ongoing.	
2.9	Measure an initial level of NRW at each PMA	WP	Actual																															Flow meter installation is ongoing.	
2.10	Conduct target NRW components (A & B) for each PMA	WP	Actual																															Flow meter installation is ongoing.	
2.11	Develop NRW reduction operation target for review by Head of Distribution Department	WP	Actual																															Flow meter installation is ongoing.	
2.12	Develop NRW reduction operation target for each PMA	WP	Actual																															Flow meter installation is ongoing.	
2.13	Monitor the progress of the NRW reduction operations at each PMA	WP	Actual																															Flow meter installation is ongoing.	
2.14	Monitor the progress of the NRW reduction operations at each PMA	WP	Actual																															Flow meter installation is ongoing.	
2.15	Measure level of NRW of each PMA at the end of the inspection operations	WP	Actual																															Flow meter installation is ongoing.	
2.16	Prepare a report on pilot projects	WP	Actual																															Flow meter installation is ongoing.	
2.17	Develop manual of NRW reduction for Area Office managers and field engineer	WP	Actual																															Flow meter installation is ongoing.	
3.1	Establish a Working Group for NRW reduction planning	WP	Actual																															Flow meter installation is ongoing.	
3.2	Review existing plans, implementation structure, on-the-job training mechanism etc. related to NRW	WP	Actual																															Flow meter installation is ongoing.	
3.3	Conduct hydraulic water system distribution analysis of the pipeline	WP	Actual																															Flow meter installation is ongoing.	
3.4	Develop outlines of the medium term strategy plan and its annual NRW reduction plan (approved by the PMA)	WP	Actual																															Flow meter installation is ongoing.	
3.5	Develop the first reduction strategy plan (2018-2022) for approval by PMA	WP	Actual																															Flow meter installation is ongoing.	
3.6	Develop an annual NRW reduction plan based on the strategy plan as an input of the medium term strategy plan of CTWB for approval by PMA	WP	Actual																															Flow meter installation is ongoing.	
3.7	Develop plan/annual report for NRW reduction	WP	Actual																															Flow meter installation is ongoing.	

Duration / Phasing

Project Monitoring Sheet II (Revision of Plan of Operation)

PM Form 3-3 Monitoring Sheet II

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project

Inputs (the Japanese side)

Task No.	Task Name	WP	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Remarks	Monitoring Station
1	JICA Expert	WP																														
1	Chief Advisor (NRM) Reduction Planning	Actual																														
2	Facility Manager / Deputy Chief Advisor (NRM) Reduction Planning	Actual																														
3	Chief Advisor (NRM) Operations Management	Actual																														
4	Chief Advisor (NRM) Technology	Actual																														
5	Chief Advisor (NRM) Commercial Ops	Actual																														
6	Chief Advisor (NRM) Hydraulics/ GIS	Actual																														
7	Chief Advisor (NRM) Procurement Management (Coordinator)	Actual																														
Equipment																																
1	Large-diameter equipment	WP																														
2	Bulk meters (at source, low meter)	WP																														
3	Water meter, flow meter and valve	WP																														
4	Pipe repair equipment	WP																														
5	Various (bulk up tank)	WP																														
6	GIS data, office equipment	WP																														
7	FCM/Other	WP																														
8	Implementation of CM/PC and calibration system	WP																														
9	GIS and database training	WP																														
10	Training in Japan	WP																														

Monitoring Plan

Task No.	Task Name	WP	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Remarks	Monitoring Station
1	Finalize and coordinate components	Actual																														
2	Finalize Detail Plan of Operations (PDO) for review and approval by JICA	Actual																														
3	Review Detail Plan of Operations (PDO) for review and approval by JICA	Actual																														
4	Organize monthly technical meetings	WP																														
5	Organize quarterly project meetings	WP																														
6	Conduct joint monitoring semi-annually	WP																														
7	Submit Monitoring Sheet to JICA Nagasaki Office semi-annually	WP																														
8	Monitoring Mission from JICA to JET Review	WP																														
9	Organize information sharing sessions for FCMB/FCI including Area Offices	WP																														
10	Collate and compare data for reduction of NRW	WP																														
11	Develop a Business Plan for capacity assessment for each level of the management staff (i.e. members of NW/Agm and Action Team)	WP																														
12	Conduct joint capacity assessment of the relevant staff	WP																														
13	Organize Capacity Development (CD) Plan	WP																														
14	Conduct reduction report for each RWA by the 1st quarter of the second year	WP																														
15	Collate and compare for reduction for semi-annual joint monitoring	WP																														
Outputs																																
1	Project Program Report	WP																														
2	Project Completion Report	WP																														
Outputs																																
1	Finalize Project Details	WP																														
2	Preparation of public relations materials	WP																														
Monitoring and Evaluation in the Post-Program Period																																
1	Final Monitoring JICA (not completed item)	WP																														
2	Post evaluation by JICA	WP																														

Version: 1  
Date: 8 Nov 2021

## List of the procured Equipment for the Project

No.	Equipment Specification	County to Purchase		Quantity	Remarks
		Japan	Nigeria		
<b>For Activity 1-2</b>					
1	Ultrasonic flow meter (stationary, 220m)		●	2	Lower Usama Water Treatment Plant
2	Ultrasonic flow meter (stationary, 300m)		●	2	Lower Usama Water Treatment Plant
3	Data logger (stationary)		●	1	Lower Usama Water Treatment Plant
<b>For Activity 2-4 and 2-8</b>					
1	GIS software		●	1	HQs
2	GIS software		●	1	HQs
3	Plotter (A0)		●	1	HQs
4	GPS terminal		●	2	HQs
5	Personal computer		●	2	HQs
6	Anti-virus software		●	2	HQs
7	UPS		●	2	HQs
<b>For Activity 2-5</b>					
1	Ultrasonic flow meter (stationary)		●	1	Garki I Pilot Area Office
2	Data logger (portable)		●	1	Garki I Pilot Area Office
3	Flow meter		●	1	To be determined through Activity 2-4, then procured additionally.
4	Flow meter		●	1	To be determined through Activity 2-4, then procured additionally.
5	Flow meter		●	1	To be determined through Activity 2-4, then procured additionally.
6	Flow meter		●	2	To be determined through Activity 2-4, then procured additionally.
7	Flow meter		●	2	To be determined through Activity 2-4, then procured additionally.
<b>For Activity 2-7</b>					
1	Sluice valve		●		To be determined through Activity 2-4, then procured additionally.
2	Sluice valve		●		To be determined through Activity 2-4, then procured additionally.
3	Sluice valve		●		To be determined through Activity 2-4, then procured additionally.
4	Sluice valve		●	6	To be determined through Activity 2-4, then procured additionally.
5	Sluice valve		●	4	To be determined through Activity 2-4, then procured additionally.
6	Sluice valve		●		To be determined through Activity 2-4, then procured additionally.
7	Sluice valve		●	2	To be determined through Activity 2-4, then procured additionally.
<b>For Activity 2-10</b>					
1	Ultrasonic flow meter (portable)		●	6	3 Pilot Area Offices
2	Data logger (portable)		●	6	3 Pilot Area Offices
3	Leak noise correlator		●	2	3 Pilot Area Offices, to be stored in HQs.
4	Water leak detector		●	6	3 Pilot Area Offices
5	Non-metal pipe locator		●	3	3 Pilot Area Offices
6	Metal locator		●	3	3 Pilot Area Offices
7	Time integral water leak detector		●	3	3 Pilot Area Offices
8	Acoustic rod		●	9	3 Pilot Area Offices
9	Distance meter		●	3	3 Pilot Area Offices
10	Hammer drill		●	3	3 Pilot Area Offices
11	Boring bar		●	9	3 Pilot Area Offices
12	Drill bit		●	3	3 Pilot Area Offices
13	Portable residual chlorine analyzer		●	3	3 Pilot Area Offices
14	Metal pipe and cable locator		●	3	3 Pilot Area Offices
15	Reference meter		●	3	3 Pilot Area Offices
16	Leakage quantity measurement device		●	3	3 Pilot Area Offices
17	Personal computer		●	3	3 Pilot Area Offices
18	Anti-virus software		●	3	3 Pilot Area Offices
19	UPS		●	3	3 Pilot Area Offices
20	Inkjet printer		●	3	3 Pilot Area Offices
21	Digital camera		●	3	3 Pilot Area Offices
<b>For Activity 2-13</b>					
1	Generator		●		To be procured soon.
2	Asphalt cutter		●		To be procured soon.
3	Concrete breaker		●		To be procured soon.
4	Small-sized dewatering pump		●		To be procured soon.
5	Small-sized tamper		●		To be procured soon.
6	Electric drum		●		To be procured soon.
7	Customer meter		●		To be determined through Activity 2-10, then procured.
8	Customer meter		●		To be determined through Activity 2-10, then procured.
9	Customer meter		●		To be determined through Activity 2-10, then procured.
10	Customer meter		●		To be determined through Activity 2-10, then procured.
11	Customer meter		●		To be determined through Activity 2-10, then procured.
<b>For Output 2</b>					
1	Pickup truck for pilot sites		●	2	HQs and three Pilot Area Office
<b>For Operation of the Project</b>					
1	Laser printer		●	1	HQs
2	Inkjet printer		●	1	HQs
3	Multifunction copier		●	1	HQs
4	Graphic/movie editing software		●	1	HQs

## Annex 2

## Training Programme (1st Training in August 2015)

### Title of Training Course:

The Federal Capital Territory Reduction of Non-Revenue Water Project (Water Supply Services Management and NRW Reduction)

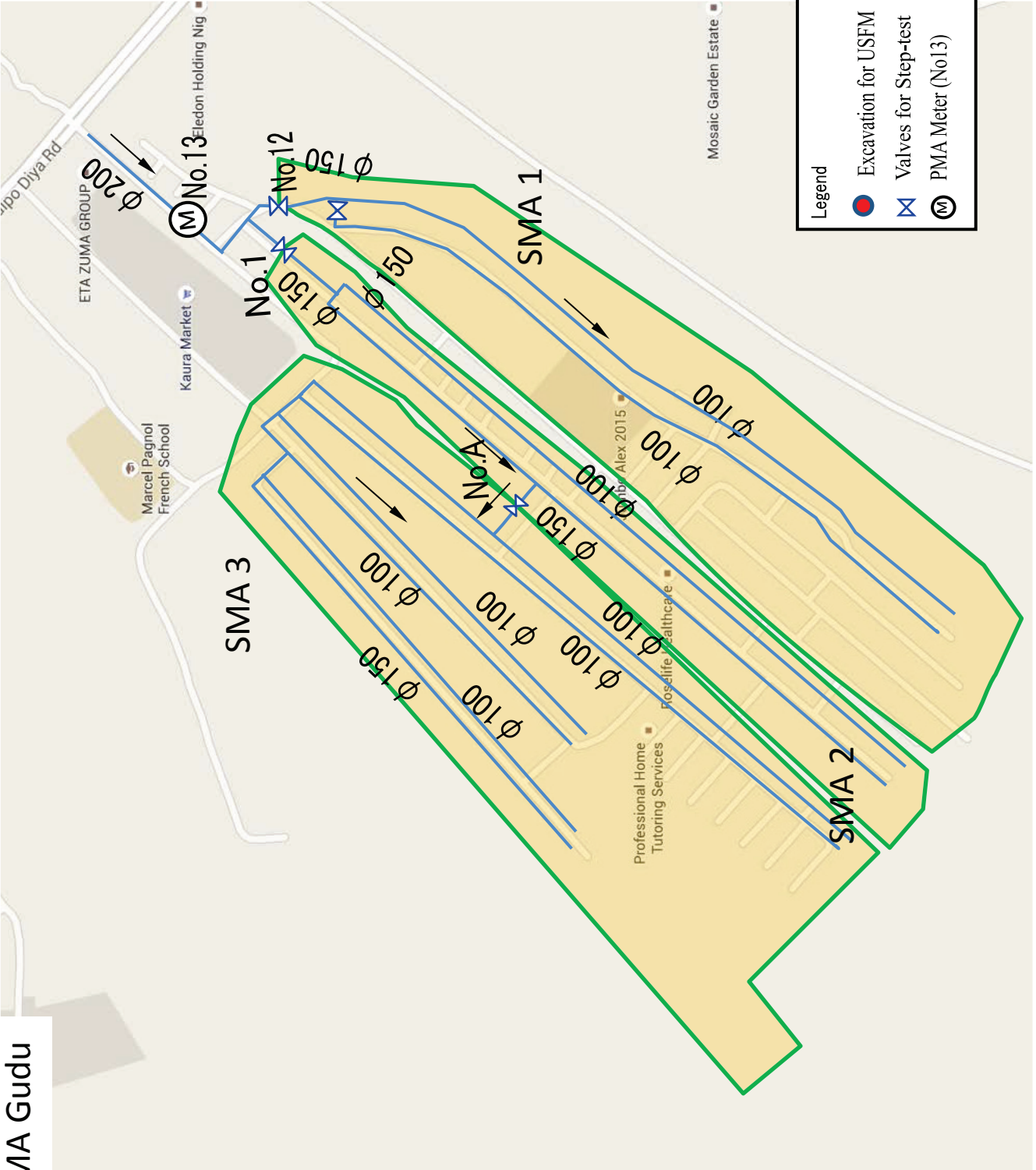
### Purpose of Training:

Necessity of comprehensive management of water supply services, and knowledge and technology about NRW reduction are shared and diffused in FCTWB. In particular,

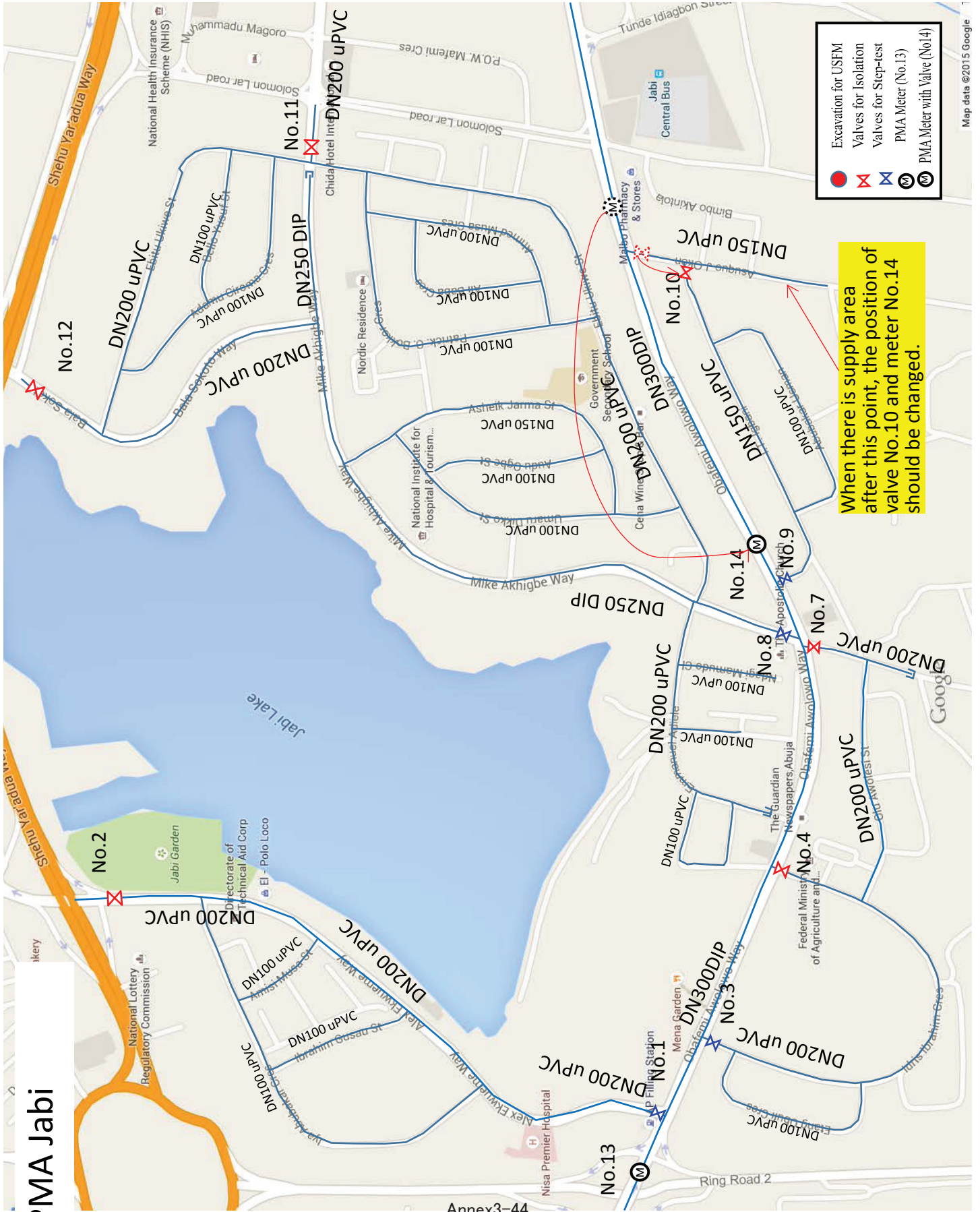
1. Trainees understand institution and system of water supply services and various efforts in Japan and Yokohama City, and then can compare them with those in Nigeria.
2. Trainees understand a variety of skills and practical approaches about NRW reduction, and then contribute to taking appropriate response to NRW in Pilot Metering Area (PMA) and apply their know-how gained to routine works of FCTWB.
3. Trainees enhance understanding of planning and operations in water supply services, and then contribute to future improvement of management of water supply services of FCTWB.

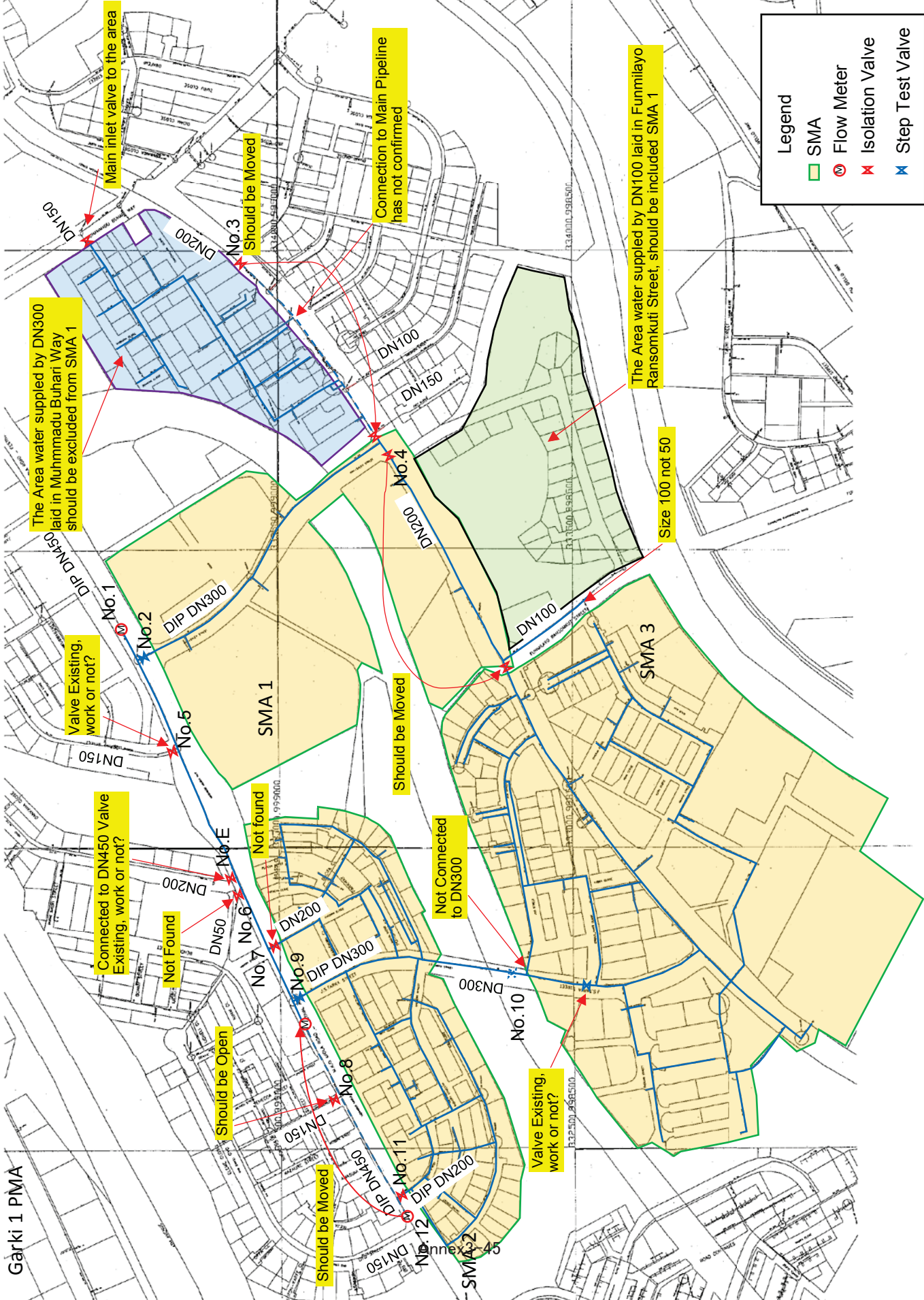
### Schedule and Contents of Training Course

Date	Contents	Description	Division/Section in charge	Place
14/8(Fri)	Traveling	( Abuja - ) *Turkish Airlines TK624		
15/8(Sat)	Traveling	( - Istanbul - Abuja - ) *Turkish Airlines TK050		
16/8(Sun)	Traveling	( - Tokyo - Yokohama)		
17/8(Mon)	Orientation	Briefing of Training Course		JICA Yokohama
	Courtesy Call	Director General of Yokohama Waterworks Bureau (YWWB)	International Operations Division	YWWB HQs
	Overview of Water Supply in Japan and Yokohama	To understand water supply, institutions, laws and regulations in Japan, and water supply services of YWWB.	Construction Division	JICA Yokohama
18/8(Tue)	Self-supporting Accounting System and Public-Private Partnership (PPP)	To understand self-supporting accounting system and PPP of YWWB, and challenges in their adoption.	Accounting and Finance Division	YWWB HQs
	Rehabilitation Project of Purification Plant by PFI	To understand conditions of PPP adoption and current issues and advantages through the case of YWWB.	Kawai Purification Plant	Kawai Purification Plant
	Membrane Filtration	To visit ceramic membrane filtration at purification plant rehabilitated by PPP.	Kawai Purification Plant	Kawai Purification Plant
19/8(Wed)	Water Tariff Management	To enhance understanding of water tariff management for right (customer-friendly) billing and collection through the case of YWWB including customer management, welfare-purpose exemption and systematic suspension of water supply against debtor.	Pricing Division	JICA Yokohama
	Customer Services (CS) Center	To enhance understanding of CS through the practical case of YWWB	Services Promotion Division	Customer Services Center
	Customer Services (CS) and Public Relations (PR)	To enhance understanding of CS and PR through the case of YWWB such as customer comments and education for elementary students.	Services Promotion Division	JICA Yokohama
20/8(Thu)	Mapping System	To enhance understanding of formulation of GIS, its utilization, management of inventory and drawings through the case of YWWB, in particular, Mapping System and Network Drawing Book.	Water Supply Division, Pipeline Information Section	Nishiya Purification Plant
	Water Supply Operation Management	To enhance understanding of water supply operation management through the case of YWWB, such as Water Supply Block System and SCADA covering water sources, purification plants, reservoirs and distribution network.	Water Purification Division, Water Supply Control and Management Section	Nishiya Purification Plant
21/8(Fri)	Outline of Leakage (NRW) Prevention	To understand water leakage as a part of NRW through lectures on mechanism of leakage occurrence, leakage survey planning and detection equipment.	Water Supply Division, Water Leakage Management Section	Nishiya Purification Plant
	Leakage Detection Demonstration (Training Facility)	To understand advantage of training facility owned by water supply services agency for capacity development and technology succession.	Water Supply Division, Water Leakage Management Section	Pipe Training Yard (Nishiya Purification Plant)
22/8(Sat)				
23/8(Sun)				
24/8(Mon)	Aged Pipe Replacement Plan	To enhance understanding necessity of pipe rehabilitation, its prioritization and aspects of service life (lifespan) through the case of	Water Supply Division	JICA Yokohama
	Pipe Replacement Works	To enhance understanding of supervision and safety control of construction works through site visit.	Area Construction Division	Field Site
25/8(Tue)	Water Meter Maintenance	To enhance understanding of components of water meter and its maintenance, as well as necessity of its accuracy check through metering test at laboratory of YWWB.	Maintenance Division, Water Meter Section	Nakamura Water Plaza (Meter Yard)
	Human Resources Development (HRD)	To enhance understanding of HRD through the case of YWWB, in particular, Career Build-up Programme, Personnel Relocation Programme and tools such as Achievement Check Sheet.	Personnel Affairs Division	YWWB HQs
	Technology Succession	To enhance understanding of technology succession through lecture on routine OJT and training programme.	Human Resources Development Division	YWWB HQs
26/8(Wed)	Water Supply Planning	To enhance understanding of Water Demand Forecasting, calculation of Design Water Supply and accordingly Facility Development Planning.	Planning Division	JICA Yokohama
	Asset Management	To enhance understanding of Asset Management, in particular, service life (lifespan), prioritization and inspection & maintenance.	Planning Division	JICA Yokohama
	Medium-Term Management & Financial Planning	To enhance understanding of how to set vision, long/medium-term goals and annual objectives, and progress management of them, financial planning and annual budgeting for comprehensive management of water supply services through the case of YWWB. Also, to understand the balance between income and expenditure and how to set water tariff scheme based on it for self-supporting accounting system.	Business Planning Division	JICA Yokohama
27/8(Thu)	Purification Plant	To enhance understanding of conventional purification process (receiving well, sedimentation, filtration, chemical dosing facilities such as flocculant) and appropriate operation and maintenance of purification	Kosuzume Purification Plant	Kosuzume Purification Plant
	Preparation of Action Plan	Trainees prepare Action Plan(s) for contribution to FCTWB, based on knowledge gained in training course.	YWC	JICA Yokohama
28/8(Fri)	Presentation	Presentation of Action Plan, questions and answers, discussion	YEC, YWC	
	Evaluation Meeting		JICA	JICA Yokohama
	Certificate Awarding		JICA	
29/8(Sat)	Traveling	( Yokohama - Tokyo - Istanbul - Abuja ) *Turkish Airlines TK051&TK623		



# PMA Jabi





Garki 1 PMA

**Legend**

- SMA
- ⊗ Flow Meter
- ✕ Isolation Valve
- ⊗ Step Test Valve

The Area water supplied by DN300 laid in Muhammadu Buhari Way should be excluded from SMA 1

Main inlet valve to the area

No.3 Should be Moved

Connection to Main Pipeline has not confirmed

The Area water supplied by DN100 laid in Funmilayo Ransomkuti Street, should be included SMA 1

Size 100 not 50

Valve Existing, work or not?

Should be Moved

Connected to DN450 Valve Existing, work or not?

Not Found

Should be Open

No.6 Not found

Not Connected to DN300

Should be Moved

Valve Existing, work or not?

To Chief Representative of JICA Nigeria Office

## PROJECT MONITORING SHEETS

**Project Title : The Federal Capital Territory Reduction of Non-Revenue Water Project**  
**Version of the Sheet: Ver. 3 (Term covered: November, 2015 - August, 2016)**

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### I. Summary

#### 1 Progress

##### 1-1 Progress of Inputs

###### **[The Nigerian Side]**

###### Project Personnel

All project members including Project Director, Project Manager, Deputy Project Manager, Technical Managers, Non-Revenue Water (NRW) Management Team members, NRW Action Team members have been involved in the Project.

###### Land, Building and Facilities

Office spaces and necessary facilities at the Federal Capital Territory Water Board (FCTWB) have been provided for the Japanese side.

Construction of chambers for bulk flow meters has been implemented since December 2015 but is currently suspended due to non-release of the Counterpart Fund.

Chambers for flow meters and valves for the selected PMAs/SMAs were constructed.

###### Local Costs

Installation, operation and maintenance of the provided equipment and leakage repair in PMAs/SMAs have been done.

###### **[The Japanese Side]**

###### JICA Experts

Japan International Cooperation Agency (JICA) Expert Team consisting of a Chief Advisor and members for ten areas of expertise were assigned to the works in Nigeria for 35.7 man-months between November 2015 and August 2016 (56.4 man-months from the commencement of the Project in November 2014).

###### Equipment

Flowmeters, valves for the selected PMAs/SMAs and equipment for maintenance including leakage repair were procured in Nigeria for three pilot Area Offices. See the Annex-1: List of



Equipment for the Project.

Procurement of equipment for water distribution management such as zonal meters, data loggers, telemetric monitoring system, etc. has been in process in Japan.

#### Facilities

Specifications of modification of existing billing system were finalized.

Chamber construction for zonal meters is being implemented by the Nigerian contractor since March 2016.

#### Training of the Nigerian Project Personnel

GIS training on software of both GeoMedia and ArcGIS for eight project members from Distribution Department and MIS Unit was conducted in Abuja in the period between 23<sup>rd</sup> November and 1<sup>st</sup> December 2015.

Following the previous training in August 2015, the second training in Japan for eight project members from both Distribution Department and Commerce Department was conducted in the period between 19<sup>th</sup> June and 2<sup>nd</sup> July 2016. See the Annex-2: The Second Training in Japan.

### **1-2 Progress of Activities**

**[Activities for Output-1: Level of NRW of both the service area of FCWTB and water distribution areas monitored regularly.]**

No	Activity	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
1-1	Install bulk meters to water treatment plants 1 and 2	Delayed. Design of chambers, specification of flow meter, BoQ were prepared. Construction has been postponed due to insufficient Counterpart Fund.	Progress: 75%, Behind: 7.5 months Delayed and suspended. Local contractors outsourced by FCTWB have constructed chambers for bulk meters. Construction of three chambers was completed while the fourth one is 50% completed. However, cable installation, ladder and fencing are pending. The construction has been suspended due to non-payment. This is due to non-release of the Counterpart Fund.
1-2	Measure monthly water production of water treatment plants 1, 2, 3, and 4	No progress and delayed as a result of delay in Activity 1-1.	Progress: 0%, Behind: 7.0 months Delayed as a result of delay in Activity 1-1. After Activity 1-1, the Project needs at least 6 months for monitoring this Activity.
1-3	Tally the above water production data monthly	No progress and delayed as a result of delay in Activity 1-1 and 1-2.	Progress: 0%, Behind: 7.0 months Delayed as a result of delay in Activity 1-1 and 1-2. After Activity 1-1 and 1-2, the Project needs at least 6 months for monitoring this Activity.
1-4	Calculate the monthly water	Situation of billing and its system	Progress: 40%, Behind: 7.5 months

No	Activity	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
	consumption based on the billing data	have been partially assessed. In this process, the Project identified existence of duplicated/returned bills which cause inaccurate analysis of water consumption. So, the Project has suspended the Activity and will resume in line with treatment of duplicated/returned bills by FCTWB.	Delayed. FCTWB has collected information of returned bills and has deactivated them. The returned bills cause inaccuracy of calculating NRW ratio. The final specification for billing system modification was adopted. After modification, the Project needs at least 6 months for monitoring this Activity.
1-5	Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4	No progress and delayed as a result of delay in Activity 1-3 and 1-4.	Progress: 0%, Behind: 7.5 months Delayed as a result of delay in Activity 1-3 and 1-4. The Project needs at least 6 months for monitoring this Activity after obtaining the data from Activity 1-3 and 1-4.
1-6	Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system	- (*Added in PDM2 after the monitoring.)	Progress: 65%, Behind: 1.5 months Being delayed. Planning/designing of zonal meters, BoQ and specifications were completed. Construction of 6 out of 8 chambers was completed by the local contractor outsourced by JICA while the remaining 2 is ongoing. Consistent rain has affected the process of excavation of rock at the chamber site. Construction will continue as soon as favorable weather condition is achievable.
1-7	Measure and collect data for water distribution management such as water flow of zonal meters and water pressure	- (*Added in PDM2 after the monitoring.)	Progress: 0%, Behind: 0.0 months The Activity will be implemented after the completion of Activity 1-6.)

**[Activities for Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

No	Activity	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
2-1	Review existing NRW reduction operations at each pilot Area Office	Completed.	Completed.
2-2	Conduct capacity assessment of organization and the relevant staff	Baseline assessment was done in Nov.-Dec. 2014 for all project members (excluding Project Director, Project Manager and Deputy Project Manager) as well as organization, institutional and social aspects. Capacity development plan was prepared and approved by FCTWB.	Progress: 50%, Behind: 7.0 months Delayed as a result of delay in Activity 2-9 to 2-15. Interim assessment will be done when pilot project terminates.

No	Activity	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
2-3	Identify and select a Pilot Metering Area (PMA) for each Pilot Area Office based on the selection criteria of PMA	Completed. Based on criteria such as security, leakage conditions, network drawings, number of customers, three PMAs were selected: Gudu: Prince & Princess Jabi: Jabi Garki I: Area 2-2&3&7	Completed.
2-4	Prepare/update distribution network drawings for each PMA	Ongoing but delayed. Drawings for PMA of Gudu Area Office were prepared. AGIS security has hindered data import/export and analysis.	Completed. AGIS security has still hindered data import/export and analysis.
2-5	Install water flow meters to each PMA and measure in/outflows monthly	Ongoing but Delayed. Flow meters for Gudu and Jabi have been procured and delivered. Procurement in Garki I is ongoing.	Progress: 90%, Behind: 9.0 months Delayed as a result of electrical works for the ultrasonic flow meter to be installed in Garki I. All mechanical flow meters were procured and installed except the ultrasonic flow meter in Garki I. (Discussion with AEDC is ongoing.) FCTWB will complete electricity connection for the ultrasonic flow meter in Garki I.
2-6	Zone each PMA into Sub Metering Areas (SMA)	Completed. Design for zoning was done.	Completed.
2-7	Isolate a SMA by installing valves	Ongoing but delayed. Valves for Gudu and Jabi have been procured and delivered. Procurement in Garki I is ongoing.	Completed.
2-8	Update the distribution network drawings for each SMA	Delayed but ongoing. Drawings for SMAs of Gudu Area Office have been prepared. AGIS security has hindered data import/export and analysis.	Progress: 80%, Behind: 2.0 months Delayed. All existing pipelines, valves and hydrants were captured. Locations of leakage and illegal connections will be captured. AGIS security has still hindered data import/export and analysis.
2-9	Measure an initial level of NRW of each SMA	No progress and delayed as a result of delay in Activity 2-5 and 2-7.	Progress: 75%, Behind: 5.5 months Delayed as a result of different meter types, non-accessibility to meter and complexity in commercial aspects such as customer categories, water tariffs, units and Area Offices for reading, billing systems and automated estimate billing. 24 hrs flow measurement, MNF survey, Step test, Meter error test and Meter reading were completed.

No	Activity	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
			24hrs customer consumption survey, Unbilled authorized customer listing and consumption survey are ongoing.
2-10	Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA	No progress and delayed as a result of delay in Activity 2-9. Theoretical lectures and fact findings were done prior to field works.	Progress: 75%, Behind: 5.5 months Delayed as a result of different meter types, non-accessibility to meter and complexity in commercial aspects such as customer categories, water tariffs, units and Area Offices for reading, billing systems and automated estimate billing. Leakage detection acoustic survey and Illegal connection survey were completed.
2-11	Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of Distribution Department	No progress and delayed as a result of delay in Activity 2-10.	Progress: 30%, Behind: 4.5 months Delayed and the Activity has been done provisionally. The plan is under preparation.
2-12	Review and approve NRW reduction operation plan of each SMA	No progress and delayed as a result of delay in Activity 2-11.	Progress: 30%, Behind: 4.5 months Delayed and the Activity has been done provisionally. The plan is under preparation.
2-13	Implement NRW reduction operations at each SMA	No progress and delayed as a result of delay in Activity 2-12.	Progress: 45%, Behind: 4.5 months Delayed and the Activity has been done provisionally. Repair of leakages completed in three PMAs. Meter replacement and installation is ongoing in Gudu.
2-14	Monitor the progress of the NRW reduction operations of each SMA	No progress and delayed as a result of delay in Activity 2-13.	Progress: 45%, Behind: 4.5 months Delayed and the Activity has been done provisionally. Repair of leakages completed in three PMAs. Meter replacement and installation is ongoing in Gudu.
2-15	Measure level of NRW of each SMA at the end of the respective operations	No progress and delayed as a result of delay in Activity 2-14.	Progress: 0%, Behind: 6.5 months Delayed and the activity follows Activity 2-14.
2-16	Prepare a report on pilot projects, covering Activity 2-1~2-15	No progress and delayed as a result of delay in Activity 2-15.	Progress: 0%, Behind: 2.0 months Delayed and the activity follows Activity 2-15.
2-17	Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers & meter readers), incl. audio visual materials	No progress.	Progress: 0%, Behind: 2.0 months Delayed and the activity follows the above Activities.

**[Activities for Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

No	Activity	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
3-1	Establish a Working Group for NRW reduction planning	Completed, but will be reviewed in Phase-2.	Completed, but will be reviewed in Phase-2.
3-2	Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB	Completed, but will be reviewed in Phase-2.	Completed, but will be reviewed in Phase-2.
3-3	Conduct hydraulic and water pressure distribution analyses of the pipeline networks	To be implemented in Phase-2.	To be implemented in Phase-2. AGIS security may hinder data import/export and analysis.
3-4	Develop outlines of the medium-term strategic plan and its annual NRW reduction plan (approval by the Director)	To be implemented in Phase-2.	To be implemented in Phase-2.
3-5	Develop the first medium-term strategic plan (2018-2022) for approval by FCTA	To be implemented in Phase-2.	To be implemented in Phase-2.
3-6	Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA	To be implemented in Phase-2.	To be implemented in Phase-2.
3-7	Develop a planning manual for NRW reduction	To be implemented in Phase-2.	To be implemented in Phase-2.
3-8	Review existing plans, activities and implementing structure, etc. related to water distribution management	- (*Added in PDM2 after the monitoring.)	Progress: 70%, Behind: 7.0 months Delayed as a result of delay in information submission from Area Offices. 6 out of 13 Area Offices submitted the required information. There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances.
3-9	Establish framework of water distribution management	- (*Added in PDM2 after the monitoring.)	Progress: 25%, Behind: 0.5 months Being delayed. Water Distribution Management Committee was established and concept was endorsed. There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances.

### 1-3 Achievement of Output

#### [Output-1: Level of NRW of the service area of FCTWB is monitored regularly.]

No	Indicator	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
1a	Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first <u>(*replace by "second" in PDM2)</u> year of the Project.	No achievement (delayed). Monthly NRW ratio based results of Activity 1-5 has not been obtained due to delay in Activity 1-1 to 1-4. So, time frame is changed from the third quarter of the first year to the third quarter of the second year.	No achievement (delayed). Monthly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-1 to 1-4. In the current schedule, it is expected that monthly NRW ratio will be obtained from Dec. 2016, the first quarter of the third year.
1b	Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the first <u>(*replace by "second" in PDM2)</u> year of the Project.	No achievement (delayed). Same as the above in Indicator 1a.	No achievement (delayed). Same as the above in Indicator 1a.
1c	Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors <u>(*replace by "Management" in PDM2)</u> of FCTWB from the third quarter of the first <u>(*replace by "second" in PDM2)</u> year of the Project.	No achievement (delayed). Quarterly NRW ratio based results of Activity 1-5 has not been obtained due to delay in Activity 1-1 to 1-4. So, time frame is changed from the third quarter of the first year to the third quarter of the second year.	No achievement (delayed). Quarterly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-1 to 1-4. In the current schedule, it is expected that quarterly NRW ratio will be obtained from Mar. 2017, the second quarter of the third year.
1d	Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department from the first quarter of the third year of the Project.	- (*Added in PDM2 after the monitoring.)	No achievement (as planned).

#### **Verification of Achievement and Implementing Process**

Under the condition that the Counterpart Fund for inputs by the Nigerian side has not been released, FCTWB has made efforts for chamber construction by outsourcing and staff assignment and logistics. But, the chamber construction has been suspended due to non-release of the Fund, and this has caused delay of measuring and tallying monthly water production data in Activity 1-2 and 1-3.

Since a large number of return bills exist in the billing system, as a decision making of project operation, the Project suspended modification of the billing system, which is an input by the Japanese side, and then requested that FCTWB collects information on the return bills and deactivates them prior to conducting the modification. As a result, this has caused delay of calculating monthly water consumption in Activity 1-4.

Consequently, monthly NRW ratio has not been calculated in Activity 1-5, and Indicator 1a, 1b and 1c

Although the Project has not achieved Indicator 1a, 1b and 1c and been behind the schedule, there are no problems in the implementing process. However, monitoring period for six months at least may not be ensured in the current schedule.

**[Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

No	Indicator	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
2a	Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations.	No achievement. Although time frame is not specified, this indicator is supposed to be obtained in Sep. 2015, the fourth quarter of the first year. So, this means delayed.	No achievement (delayed). Although time frame is not specified, this indicator has not been obtained, this mean delayed. In the current schedule, it is expected that this indicator will be obtained from Oct. 2016, the first quarter of the third year.
2b	Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project.	No achievement (as planned).	No achievement (as planned).

**Verification of Achievement and Implementing Process**

Under the condition that the Counterpart Fund for inputs by the Nigerian side has not been released, FCTWB has made efforts for chamber construction by outsourcing, procurement of materials, installation, staff assignment and logistics. But, quality of the input, particularly constructed facilities and work performance, has been not necessarily ensured properly or as planned, although minimum functionality exists at least.

On the other hand, inputs from the Japanese side, mostly Experts and procurement of equipment, have been done as planned or necessary. However, NRW ratios in PMAs/SMAs have not yet calculated as a result of different meter types, non-accessibility to meter and complexity in commercial aspects such as customer categories, water tariffs, units and Area Offices for reading, billing systems and automated estimate billing.

Conditions and difficulty in implementing activities as well as issues vary by pilot Area Offices, but pilot project will lead to fruitful findings and lessons for FCTWB and the Project. Sense of participation in the Project and motivation of project members from pilot Area Offices are holistically high.

Although the Project has not achieved Indicator 2a and been behind the schedule, there are no problems in the implementing process.

**[Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

No	Indicator	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
3a	By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval.	No achievement (as planned).	No achievement (as planned).
3b	By October 2017, an annual NRW reduction plan (2018) is incorporated in FCWTB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval.	No achievement (as planned).	No achievement (as planned).
3c	A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project.	No achievement (as planned).	No achievement (as planned).
3d	By November 2016, framework of water distribution management is established.	- (*Added in PDM2 after the monitoring.)	No achievement (as planned).

**Verification of Achievement and Implementing Process**

Indicator 3a, 3b and 3c and related activities for Output-3 are subject to Phase 2 of the Project, which is scheduled to be implemented from January 2017.

Activities related to Indicator 3d are in progress as plan with participation of all Area Offices, although it has taken time to collect information.

**1-4 Achievement of the Project Purpose**

**[Project Purpose: Capacity of FCTWB for NRW reduction is strengthened.]**

No	Indicator	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
a	The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.	No achievement (as planned).	No achievement (as planned).
b	NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB.	No achievement (as planned).	No achievement (as planned).
c	Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with	Ongoing. Skills and knowledge necessary for NRW reduction, such as PMA /SMA designing, preparation of GIS network drawings have been gradually	Ongoing. Skills and knowledge necessary for NRW reduction, such as minimum night flow survey, step test, leakage detection, meter error test for water



No	Indicator	Previous Monitoring (as at Nov.2015)	Current Monitoring (as at Aug.2016)
	skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level.	developed through lectures, OJT and the first training in Japan in Aug. 2015.	balance analysis has been developed through lectures, OJT and the second training in Japan in Jun.-Jul. 2016.
d	NRW ratio of each PMA in the last quarter of the Project reaches its respective target (**). Note(**):Target for each PMA is expected to be determined by the end of the first quarter of the second year.	No achievement (as planned).	No achievement (as planned).
<p><b>Verification of Achievement and Implementing Process</b></p> <p>Budget constraint of the Nigerian side is a possible obstructive factor against achievement of project purpose, particularly Indicator b.</p> <p>Achievement in Indicator c resulted from the activities for Output-2.</p> <p>FCTWB is willing to expand NRW reduction into the whole service area, and the necessity of cross-departmental function for NRW reduction such as task force is being recognized gradually.</p>			

### 1-5 Changes of Risks and Actions for Mitigation

Due to collapse in oil prices and shrinking revenue, recent budget constraint of the Nigerian side including non-release of the Counterpart Fund corresponds to an important assumption “A. Natural disaster / political instability / economic crisis that affect the Project activities do not occur.” Under this situation, there is a high possibility that FCTWB cannot complete the chamber construction of the bulk flowmeter (Output 1). Also, there is a high possibility that FCTWB cannot procure smoothly necessary materials for Output 2 activities. This is why there is a high-risk that the Project further delays and the outcome of the Project would be reduced.

### 1-6 Progress of Actions undertaken by JICA

The JICA Expert Team has encouraged the Nigerian relevant organization for budget execution, however, it is difficult to release of the Counterpart Fund. Non-release of the Fund is a decision by the Nigerian Government.

Also, the JICA Expert Team and FCTWB have negotiated with contractors to let them continue the chamber construction, however, contractors have not accepted because FCTWB cannot make an assurance for payment for construction.

### 1-7 Progress of Actions undertaken by Nigerian side

FCTWB has already submitted the request letters to FCTA for budget execution and dealt with all the necessary procedures, but the release of the Counterpart Fund is yet to be effected.

**1-8 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)**

**(1) Legal Instrument (Enabling Law) establishing FCTWB**

Legal instrument (enabling law) establishing FCTWB as an autonomous body has not yet been approved by the current National Assembly.

**(2) Grant Aid Project by Japan**

“The Project for Introduction of Clean Energy by Solar Electricity Generation System” for Lower Usuma Water Treatment Plants was commissioned in late August 2016. This contributes to stable water supply to customers of FCTWB.

**(3) Situation of Actions raised in previous Monitoring in November 2015**

**(3)-1: Action for “Limited Progress of Activities for Outut-1”**

FCTWB will liaise closely with FCTA for quick release of Counterpart Fund as soon as the government policy of Treasury Single Account is stabilized.

Situation: The Counterpart Fund approved in the financial year 2015 was not released even the financial year was extended as an extralegal measure until March 2016. The Nigerian side revalidated this approved Fund in the financial year 2016 by approval of FCT Minister and Permanent Secretary, however, the Fund has not yet been released.

**(3)-2: Action for “Suspension of Activity 1-4”**

FCTWB collated all the duplicated/returned bills, verified them and commenced the deactivation process for the bills. Report will be submitted by the middle of November 2015 to JICA Expert Team to analyze them jointly for water balance. After the deactivation and analysis, water connection and data creation will be centralized by HODs (Distribution and Commerce) in the Headquarters to avoid duplication.

Situation: FCTWB verified about 4,800 of the return bills and deactivated them by July 2016, and consequently, conditions of billing system modification was met. The final specification for billing system modification was adopted.

**(3)-3: Action for “Delay in implementing Activity 2-5 and 2-7”**

FCTWB, particularly GIS Unit and Pipeline Unit, will update GIS network drawings by physical verification during routine maintenance and capturing GPS location for existing facilities. FCTWB will obtain as-built drawings of new/old facilities certainly from Federal Capital Development Agency’s (FCDA) Engineering Services Department and FCT Agency for Mass Housing.

Situation: FCTWB, particularly GIS Unit, Pipeline Unit and Area Offices, is updating GIS

network drawings by physical verification during routine maintenance and capturing GPS location for existing facilities. There is no remarkable progress in obtaining as-built drawings of new/old facilities certainly from FCDA's Engineering Services Department and FCT Agency for Mass Housing, because of disordered storage conditions and not well organized process of drawing management.

(3)-4: Action for "AGIS Security"

FCTWB will gradually develop its own customized GIS database.

Situation: FCTWB is updating its own GIS database as mentioned in (3)-3, meanwhile, FCTWB has referred the challenge to FCTA's Permanent Secretary and is working closely with AGIS to solve the issue.

**(4) Situation of Actions for Recommendation by JICA Monitoring Survey Mission in previous Monitoring in November 2015**

(4)-1: Action for "Further efforts towards the project management and a stronger sense of ownership by FCTWB"

Situation: Monthly technical meetings with attendance of 20-30 members have been organized and facilitated by Technical Manager and Coordinator. This means a sense of ownership among working level staff in project management has been enhanced.

(4)-2: Action for "Project management on the basis of Monitoring Sheets"

Situation: Project members have understood concept and usefulness of Monitoring Sheets through practical and joint monitoring process. Although Project members have suggested preparing Monitoring Sheets by themselves with voluntary efforts, the knowledge and skills of preparation will be gradually developed.

(4)-3: Action for "Sharing of Capacity Assessment and Development Plan"

Situation: The Project has planned to conduct interim capacity assessment when development of capacity on NRW reduction is expected through pilot project activities for Output 2, as well as mini-workshop for enhancing motivation. However, due to delay in most of Pilot project activities, these have not been conducted.

## **2 Inspection of the Project Implementation Process**

### **2-1 Evaluation on the Process of Capacity Development**

There is no issue. The JICA Expert Team accelerates the Nigerian counterparts' ownership when they implement the capacity development.

### **2-2 Monitoring and Information Sharing**

Monitoring system between the JICA Expert Team and FCTWB is satisfied. Both sides share the information on the progress of the Project activities through daily communication, monthly and quarterly regular meetings.

### **2-3 Communication among the Project Team**

There is no issue.

### **2-4 Involvement by JICA Nigeria Office**

JICA Nigeria Officer, who is in charge of this Project management in JICA Nigeria office, has often visited the Project office and has communicated with the Project Team.

### **2-5 Involvement of Counterpart**

Generally, the Project members from the Nigerian side have been involved well through participation in the Project activities and attendance in monthly and quarterly regular meetings.

Especially, one FCTWB staff belonging to Gudu Area Office has a high motivation to implement the voluntary NRW reduction activities outside the Pilot Metering Area based on action plan which was prepared by him in the training course in Hokkaido, Japan.

From the beginning, the Project aims to promote such voluntary NRW reduction activities outside the Pilot Metering Area by the Nigerian side self-effort, this is good example of the Project activities.

### **2-6 Assignment of Counterparts**

Generally, the Nigerian side has assigned roles and responsibilities to appropriate staff. However, considering sustainability of implementing NRW reduction based on a NRW reduction strategic plan to be prepared through Output 3 activities, it may be necessary for the Nigerian side to enhance project management skill for working level staff such as Head of Unit for example. Such project management skill should be enhanced through the Project activities. In addition, the existing operational structure should be reviewed.

### **2-7 Involvement of Relevant Organizations**

FCTA has been involved well in the Project as the chair of Joint Coordination Committee (JCC) and also has assisted and advised the Project in dealing with issues including the Counterpart Fund and AGIS security.

The Project has shared information with other relevant organizations such as FCDA, Federal Ministry of Water Resources (FMWR), Embassy of Japan and international development partners through JCC meetings, workshops and newsletters. JICA organized a stakeholder meeting which was chaired by FMWR with attendance of Kaduna State Water Board in November 2015.

## **2-8 Other Issues related to Project Implementation Process**

### **(1) Communication between Distribution Department and Commerce Department**

The JICA Expert Team reported that Distribution Department and Commerce Department have to implement the cross-cutting activities for NRW reduction. Both Departments understand the importance of collaboration and active communication, however they need to collaborate more to the success of the Project. Also, active participation of Commerce Staff (FCTWB Headquarters) particularly in the field activities is a key to success of the Project and improvement in water supply services.

### **(2) Necessity for Strengthening Partnership between FCDA and FCTWB**

It is necessary for FCTWB to obtain the updated as-built drawings and information correctly and timely for proper operation, maintenance and implementing NRW reduction activities efficiently. However, FCWB has not been able to obtain the updated as-built drawings and information in respect of its operation and maintenance activities from FCDA that is in charge of provision of infrastructure. This is as a result of lack of feedback system between the two sister agencies. So, FCTWB is encouraged to always share its operation and maintenance experiences with FCDA while FCDA is equally advised to carry along FCTWB in its water project implementation.

### **(3) Lack of the Quality Management**

The monitoring survey mission found quality of information and performance as well as quality of constructed facilities is not properly managed by FCTWB. For example,

- (a) Information such as deliverables from FCTWB has lacked often accuracy, so this has led to decrease in data reliability and duplication of effort.
- (b) There are many honeycombs on the surface of the concrete of constructed chambers for the bulk flowmeter.
- (c) In Garki I Pilot area, FCTWB cannot read PMA flowmeter regularly because of mortar plastering on entire concrete slab covers.
- (d) In Gudu Pilot area, inside of the chamber for PMA flowmeter is in muddy conditions because FCTWB has not placed concrete slab covers.

It is very important to pay attention to quality management in order to enhance the Project outcome with adequate performance, avoid further delay of the Project and keep sustainability through proper operation and maintenance.

## **3 Other Issue from the Technical Aspect**

This is the view of the monitoring survey mission from JICA headquarters about prepaid meter.

### **(1) Structures of Prepaid Meters**

FCTWB has two types of prepaid meters. The one shown to the mission was of combination of mechanical meter and an electronic device mounted thereon (the manufacturer: Henan Suntront Tech Co., Ltd., China) The mechanical part measures flow and the electronic device seemed calculating consumption and water charge accordingly and deducting it from a pre-paid amount. Two pre-paid meters installed were shown to the mission in Gudu area. One of them was found indicating blank display because of battery run-out and dismantled from the service connection. The meters of this model are owned and operated by a private contractor.

The other model is of ultrasonic flowmeter, which is composed of outdoor unit for measurement and indoor unit for charging and display (Manufacturer: Universal Metering System, UK). Both are connected by wireless.

### (2) Life of Prepaid Meters

Because the former model of pre-paid meters uses mechanical part similar to the conventional model, the life of a prepaid meter will be governed by the mechanical part and assumed as 6 to 7 years at the longest or two to three years from the mission's experience in developing countries. As the Gudu case suggests, a pre-paid meter has another elements to consider, a battery. An Electronic device requires power, that is supplied by a built-in battery. Although some manufacturers claim battery life may be 10 years nowadays, but a Gudu case may suggest otherwise. The replacement of a prepaid meter costs three to eight times more than a conventional one.

Since there is no moving part in the latter model, the meter life is expected much longer than mechanical one and governed by the life of battery.

### (3) Meter-reading and Maintenance

It should be noted that meter-reading of prepaid meters should be regularly done by a water service provider itself or by a contractor unless the service provider maintains data collection and analysis of individual customers at the time of pre-payment of water charges. If this process of customer information is omitted, an opportunity to detect malfunctioning meters or illegal connections including meter-bypassing will be lost.

JICA is planning to extend technical assistance to a city in Palestine, and suburbs of the city is found successfully deploying prepaid meters. The water service provider of the suburbs contracted with the supplier of prepaid meters for performance guarantee and maintenance services of meters. The same service provider required the meter supplier tailoring software to accommodate the provider's requests such as lower water rate for limited consumption by low income families, recording seasonal and daily fluctuation of demands, and abnormally high or low consumption of individual customers.

Unless such systematic cares are taken by water provider, use of prepaid meters is critical in terms of NRW reduction and the financial aspect of water service provider.

#### **4 Delay of Work Schedule and/or Problems (if any)**

##### **4-1 Detail**

###### **(1) Delay of the Project**

Available monitoring period of Activities 1-2 to 1-5 will be insufficient due to delay in the Activities. The Project needs at least six months for monitoring the Activities 1-2 to 1-5.

###### **(2) SMA out of PMA Monitoring Area**

PMA meters were relocated from originally-designed position to other position in Jabi and Garki I due to difficulty in implementation, which results in making a SMA each be out of PMA monitoring area.

##### **4-2 Cause**

###### **(1) Delay of the Project**

(1)-1 The chamber construction for bulk flowmeters and procurement of necessary materials for pilot activities has delayed and suspended due to non-release of the Counterpart Fund in 2015&2016.

(1)-2 It takes a lot of time to obtain the correct situation due to non-existence of the as-built drawings and the restriction of GIS usage. FCTWB has to update GIS network drawings by physical verification during routine maintenance and capturing GPS locations for existing facilities.

###### **(2) SMA out of PMA Monitoring Area**

###### Jabi (SMA1)

It founds that it was physically difficult to settle the PMA flowmeter and to monitor water flow at the original location, because the distance from the ground level to the location of pipeline was unexpectedly deep (6.3m from the ground level). See the Annex-3: Location of the SMAs to be removed from PMA Monitoring.

This is why the Project Team has to change the location for setting the PMA flowmeter to other location.

###### Garki I (SMA2-1)

It founds that FCTWB could not supply water to the western area in SMA2 if the Project Team closes the valve at the original location. See the Annex-3: Location of the SMAs to be removed from PMA Monitoring.

This is why the Project Team has to change the location for setting the PMA flowmeter to other location in order to continue supplying water to habitants in the western area in SMA2.

The reason why such situation happened is that FCTWB does not have as-built drawings which reflect the latest correct situation.

#### **4-3 Action to be taken**

##### **(1) Against “Delay of the Project”**

###### **(1)-1 Extension of the Project Period**

As a result of the second joint monitoring survey, both sides found the Project delays six months from the original plan of operation, and also found that it is impossible to secure necessary time frame to monitor the monthly water production, consumption and NRW ratio within the present project period. Without the monitoring of them, the Project cannot make a realistic NRW reduction strategic plan through the activities of Output 3, so that it is indispensable for securing the Project’s outcome. In addition, both sides confirmed that the Nigerian side cannot fulfill some undertaking (completion of the chamber construction of bulk flowmeter and cable installation) due to the non-release of the Counterpart Fund.

Therefore, as a countermeasure against this issue, the Nigerian side requested to the Japanese side to extend the project period in order to secure the necessary time frame to monitor the monthly water production, consumption and NRW ratio.

###### **(1)-2 Taking over the Chamber Construction and Procurement of Small Materials for Pilot Activities**

FCTWB is liaising closely with FCTA for quick release of the Counterpart Fund, however, both sides confirmed that it is almost difficult for the Nigerian side to complete the chamber construction for bulk flowmeter. It is indispensable to complete the construction in order to set the bulk flowmeter for monitoring monthly water production in Output 1 activities.

In addition, both sides confirmed that there are some possibilities to procure small materials for Pilot activities in Output 2.

Therefore, as a countermeasure against this issue, the Nigerian side requested to the Japanese side to take some undertakings as below:

- The total cost of chamber construction for bulk flowmeters (civil works and cable installation) (\* related to Output 1)
- Procurement of small materials for pilot activities that are yet to be procured by FCTWB



(\*related to Output 2)

(1)-3 Relaxing the Restriction of GIS Usage

Now that FCTWB cannot get access to some critical information for the Project activities, the restriction has to be relaxed.

**(2) Against “SMA out of PMA Monitoring Area”**

(2)-1 Removing the SMA out of PMA

Both sides technically confirmed that SMA 1 in Jabi and SMA 2-1 in Garki I are constrained to be out of PMA monitoring area. See the Annex-3: Location of the SMAs to be removed from PMA Monitoring. In order to avoid further delay of the Project activities (Activity 2-8 to 2-16), the Project Team has to remove these SMAs from the target of the Project. As a result, the number of SMAs need to be reduced as below:

- Jabi : 2 areas
- Garki I : 3 areas (SMA2-2 will not be removed.)

(2)-2 Collecting necessary Information from FCDA

FCTWB has to get the necessary information in order to implement the Project activities efficiently.

**4-4 Roles of Responsible Persons/Organization**

**[Nigerian Side]**

**(1) For “Delay of the Project”**

(1)-1 Extension of the Project Period

If JICA headquarters approves this Monitoring Sheet, the Japanese side prepares the draft revised Record of Discussion (R/D) for this purpose. After the discussion on the revised version of R/D, the Nigerian side signs the revised one.

(1)-2 Taking over the Chamber Construction and Procurement of Small Materials for Pilot Activities

If JICA headquarters approves this Monitoring Sheet, FCTWB terminates the original contract between FCTWB and contractors as soon as possible before the JICA Expert Team conducts a new contract with the contractors based on terms and conditions of the original contract.

(1)-3 Relaxing the Restriction of GIS Usage

FCTWB has referred the challenge to FCTA's Permanent Secretary and is working closely

with AGIS to solve the issue.

## **(2) For “SMA out of PMA Monitoring Area”**

FCTWB obtains necessary as-built drawings of new/old facilities certainly from FCDA's Engineering Services Department and FCT Agency for Mass Housing.

### **[Japanese Side]**

#### **(1) For “Delay of the Project”**

##### **(1)-1 Extension of the Project Period**

Based on the request from the Nigerian side, the Japanese side considers the extension of Project period after completion of the chamber construction for bulk flowmeter to secure the necessary time frame for the monitoring period for the monthly water production, consumption and NRW ratio.

If JICA headquarters approves the extension of the project period, the Japanese side prepares the draft revised R/D for this purpose.

##### **(1)-2 Taking over the Chamber Construction and Procurement of Small Materials for Pilot Activities**

Based on the request from the Nigerian side, the Japanese side considers taking over some undertakings in order to avoid further delay of the Project as below:

- The total cost of chamber construction for bulk flowmeters (civil works and cable installation) (\*related to Output 1)
- Procurement of small materials for pilot activities that are yet to be procured by FCTWB (\*related to Output 2)

## **5 Modification of the Project Implementation Plan**

### **5-1 Plan of Operation**

As described above, based on the request from the Nigerian side, the extension of Project period will be considered by the Japanese side after completion of the chamber construction for bulk flowmeter to secure the necessary time frame for the monitoring period for the monthly water production, consumption and NRW ratio.

### **5-2 Other modifications on detailed implementation plan**

None.

(Remarks: The amendment of R/D and PDM (title of the project, duration, project site(s), target

group(s), implementation structure, overall goal, project purpose, outputs, activities, and input) should be authorized by JICA headquarters. If the Project Team deems it necessary to modify any part of R/D and PDM, the Team may propose the draft.)

## **6 Preparation by Nigerian side toward after completion of the Project**

To be considered.

## **II. Project Monitoring Sheet I & II (as attached)**

### **Annex**

Annex-1: List of Equipment for the Project

Annex-2: The Second Training in Japan

Annex-3: Location of the SMAs to be removed from PMA Monitoring

Annex-4: Participants in Preparation of Monitoring Sheet and Photos

**Project Monitoring Sheet I (Revision of Project Design Matrix)**

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project

Project Period: October 2014 to March 2018

Implementing Organization: Federal Capital Territory Administration (FCTA) / Federal Capital Territory Water Board (FCTWB)

Direct Beneficiaries: FCTWB, relevant staff of FCTWB Headquarters and Pilot Area Offices

Project Site: FCT

Version 3

Dated 22 Sep. 2016

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<p><b>&lt;Overall Goal&gt;</b> Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB</p>	<p>a. Annual NRW ratio is reduced to X% (*) at the end of the year 2021 Note (*): Target value (X%), which is expected to be determined in the medium-term strategic plan for NRW reduction, shall be tentatively filled when the final draft was approved by the Director of FCTWB, which shall be finalized when the plan is approved by FCTA</p>	<p>a. Record of NRW ratio kept by Distribution Department</p>	<p>None.</p>	<p>None.</p>	
<p><b>&lt;Project Purpose&gt;</b> Capacity of FCTWB for NRW reduction is strengthened</p>	<p>a. The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project. b. NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB. c. Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level. d. NRW ratio of each PMA in the last quarter of the Project reaches its respective target (**).</p> <p>Note (**): Target for each PMA is expected to be determined by the end of the first quarter of the second year.</p>	<p>a. Date of approval of the plan b. Result of monitoring by NRW Management Team c. Results of joint assessment based on the criteria set by the Project d. Record of NRW ratio kept by Distribution Department</p>	<p>A. Policy support for NRW reduction is not discontinued B. Natural disaster/political instability/economic crisis that affect the service area of FCTWB do not occur C. Activities to implement the medium-term strategic plan are not discontinued or delayed</p>	<p>Indicator a: None. Indicator b: None. Indicator c: Enhanced capacity has not yet been assessed, but skills and knowledge has been developed through lectures, OJT by JICA Expert Team and two trainings in Japan in August 2015 and June-July 2016. Indicator d: None.</p>	
<p><b>&lt;Outputs&gt;</b> 1. Level of NRW of both the service area of FCWTB and water distribution areas is monitored regularly</p>	<p>1a. Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the second year of the Project. 1b. Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the second year of the Project. 1c. Quarterly NRW ratio of the service area of FCTWB is reported to Management of FCTWB from the third quarter of the second year of the Project. 1d. Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department from the first quarter of the third year of the Project.</p>	<p>1a. Monthly record of NRW ratio 1b&amp;1c. Material for meetings submitted by the Distribution Department 1d. Periodic records of data on water distribution management</p>	<p>A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers</p>	<p>Indicator 1a&amp;1b&amp;1c: None and delayed as a result of delay in Activities 1-1 to 1-5 and input from the Nigerian side. Indicator 1d: None</p>	
<p>2. Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices (**)</p>	<p>2a. Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations. 2b. Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project.</p>	<p>2a. Record of NRW ratio kept by the Distribution Department 2b. Date of approval of the manuals</p>	<p>Indicator 2a: None and delayed as a result of delay in Activities 2-5, 2-8 to 2-16 and input from the Nigerian side. Indicator 2b: None</p>	<p>Indicator 2a: None and delayed as a result of delay in Activities 2-5, 2-8 to 2-16 and input from the Nigerian side. Indicator 2b: None</p>	
<p>3. A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2 (*)</p>	<p>3a. By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval. 3b. By October 2017, an annual NRW reduction plan (2018) is incorporated in FCTWB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval. 3c. A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project. 3d. By November 2016, framework of water distribution management is established.</p>	<p>3a&amp;3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan 3c. Date of approval of the manual 3d. Implementing structure and workflow of water distribution management</p>	<p>Indicator 3a: None. Indicator 3b: None. Indicator 3c: None. Indicator 3d: Water Distribution Management Committee was established and concept was endorsed.</p>	<p>Indicator 3a: None. Indicator 3b: None. Indicator 3c: None. Indicator 3d: Water Distribution Management Committee was established and concept was endorsed.</p>	

Note (\*): NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection  
Note (\*\*): A medium-term strategic plan is a five-year plan, which may include medium-term target, strategies and actions, timeframe, human resource requirement, on-the-job training mechanism, cost-benefit analysis of NRW reduction, etc. It is noted that NRW components addressed by the strategic plan are not limited to the ones mentioned in (\*) above; they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

Activities	The Nigerian Side	Inputs	The Japanese Side	Important Assumption
<p>1-1 Install bulk meters to water treatment plants 1 and 2 1-2 Measure monthly water production of water treatment plants 1, 2, 3 and 4 1-3 Tally the above water production data monthly 1-4 Calculate the monthly water consumption based on the billing data 1-5 Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4 1-6 Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system 1-7 Measure and collect data for water distribution management such as water flow of zonal meters and water pressure 2-1 Review existing NRW reduction operations at each pilot Area Office 2-2 Conduct capacity assessment of the relevant staff of each pilot Area Office 2-3 Identify and select a Pilot Metering Area (PMA) for each pilot Area Office based on the selection criteria of PMA(*3) 2-4 Prepare/update distribution network drawings for each PMA monthly 2-5 Install water flow meters to each PMA and measure in/outflows monthly 2-6 Zone each PMA into Sub Metering Areas (SMA) 2-7 Isolate a SMA by installing valves 2-8 Update the distribution network drawings for each SMA 2-9 Measure an initial level of NRW of each SMA 2-10 Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA 2-11 Develop a NRW reduction operation plan of each SMA, including reduction target, for review by Head of Distribution Department 2-12 Review and approve NRW reduction operation plan of each SMA 2-13 Implement the NRW reduction operations at each SMA 2-14 Monitor the progress of the NRW reduction operations of each SMA 2-15 Measure level of NRW of each SMA at the end of the respective operations 2-16 Prepare a report on pilot projects, covering Activity 2-1-2-15 2-17 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials</p>	<p><b>Project Personnel</b> 1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA 2. Project Manager: Director of FCTWB 3. Deputy Project Manager: HoD for Administration and Supply/FCTWB 4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce (FCTWB) 5. Members of NRW Management Team (FCTWB): - Head of Special Project Unit of Distribution Department (as Coordinator) - Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department 6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS) 7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office 8. Other personnel mutually agreed upon as necessary</p> <p><b>Land, Building and Facilities</b> 1. Office building and facilities necessary for the implementation of the Project 2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each pilot Area Office, including internet connection and air conditioners 3. Chambers for <b>bulk meters for water treatment plants</b>, flow meters and valves for the selected PMAs/SMAs. 4. Electric wiring to bulk/zonal meters, loggers and pressure sensors. 5. Other facilities mutually agreed upon as necessary</p> <p><b>Local Costs</b> 1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs 2. Administration and operational costs, including cost for local travel for the Project Personnel, demurrage at local customs point, licensing cost of radio application and cost for communication of telemetric device for selected zonal meter(s) and water pressure sensor(s) 3. Other costs mutually agreed upon as necessary</p>	<p><b>The Nigerian Side</b> 1. Chief Advisor /NRW Reduction Planning / Water Distribution Management 1 2. Deputy Chief Advisor / NRW Reduction Planning 3. NRW Reduction Operations Management 4. Leakage Detection Technology 5. Commercial Loss 6. Hydraulic Analysis / GIS 7. Procurement Manager / Coordinator 8. Facility Design / Construction Supervision 9. Equipment Design / Installation 10. Water Distribution Management 2 11. Remote Monitoring 12. Other experts mutually agreed upon as necessary</p> <p><b>Equipment</b> 1. Bulk meters and loggers for water treatment plants 2. Water flow meters, valves, and customer meters for SMA 3. Leakage detection equipment for PMA 4. Pipe repair equipment for PMA 5. Vehicles (Pick-ups) 6. Generator for project office 7. Zonal meters, loggers and water pressure sensors 8. Telemetric monitoring system with standby power generating facility for selected zonal meter(s) and/or water pressure sensor(s) 9. Other equipment mutually agreed upon as necessary</p> <p><b>Facilities</b> 1. Modification of existing billing system 2. Chambers for <b>bulk meters for water treatment plants</b>, zonal meters and water pressure sensors <b>Training of the Nigerian Project Personnel</b> 1. Four persons mutually agreed upon will be trained in Japan annually 2. GIS training in Nigeria</p>	<p><b>Japanese Experts</b> A. Natural disaster / political / instability / economic crisis that affect the Project activities do not occur.  B. Pre-Conditions A. Furnished offices for Japanese Experts are secured at the Headquarters and each Pilot Area Office of FCTWB. B. Project Personnel is assigned with the finalized list.</p>	<p><b>Issues &amp; Countermeasures</b> <b>A. Delay of the Project:</b> Available monitoring period of Activities 1-2 to 1-5 will be insufficient due to delay in the Activities. <b>(Cause)</b> - Delay and suspension of the chamber construction for bulk flowmeters and procurement of necessary materials for pilot activities due to non-release of the Counterpart Fund in 2015&amp;2016. - Taking a lot of time to obtain the correct situation due to non-existence of the as-built drawings and the restriction of GIS usage. <b>(Countermeasure)</b> - Extension of the project period based on the request from the Nigerian side. - Taking over the chamber construction and procurement of small materials for Pilot activities from the Nigerian side to the Japanese side based on the request from the Nigerian side. <b>B. SMA out of PMA Monitoring Area:</b> PMA meters were relocated from originally-designed position to other position in Jabi and Garki I due to difficulty in implementation. <b>(Cause)</b> - It was physically difficult to settle the PMA flowmeter and to monitor water flow at the original location, because the distance from the ground level to the location of pipeline was unexpectedly deep in Jabi (SMA1). FCTWB could not supply water to the western area in SMA2 if the Project Team closes the isolating valve at the original location in Garki I (SMA2-1). <b>(Countermeasure)</b> - Removing the SMA out of PMA. Both sides technically confirmed that SMA 1 in Jabi and SMA 2-1 in Garki I are constrained to be out of PMA monitoring area. In order to avoid further delay of the Project activities (Activity 2-8 to 2-16), the Project Team has to remove these SMAs from the target of the Project. - Collecting necessary information from FCDA. FCTWB has to get the necessary information in order to implement the Project activities efficiently.</p>
<p>3-1 Establish a Working Group for NRW planning (*4) 3-2 Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB 3-3 Conduct hydraulic and water pressure distribution analyses of the pipeline networks 3-4 Develop outlines of the medium-term strategic plan and its annual NRW reduction plan 3-5 Develop the first medium-term strategic plan (2018-2022) for approval by FCTA 3-6 Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA 3-7 Develop a planning manual for NRW reduction 3-8 Review existing plans, activities and implementing structure, etc. related to water distribution management 3-9 Establish framework of water distribution management</p>	<p><b>The Nigerian Side</b> 1. Chief Advisor /NRW Reduction Planning / Water Distribution Management 1 2. Deputy Chief Advisor / NRW Reduction Planning 3. NRW Reduction Operations Management 4. Leakage Detection Technology 5. Commercial Loss 6. Hydraulic Analysis / GIS 7. Procurement Manager / Coordinator 8. Facility Design / Construction Supervision 9. Equipment Design / Installation 10. Water Distribution Management 2 11. Remote Monitoring 12. Other experts mutually agreed upon as necessary</p> <p><b>Equipment</b> 1. Bulk meters and loggers for water treatment plants 2. Water flow meters, valves, and customer meters for SMA 3. Leakage detection equipment for PMA 4. Pipe repair equipment for PMA 5. Vehicles (Pick-ups) 6. Generator for project office 7. Zonal meters, loggers and water pressure sensors 8. Telemetric monitoring system with standby power generating facility for selected zonal meter(s) and/or water pressure sensor(s) 9. Other equipment mutually agreed upon as necessary</p> <p><b>Facilities</b> 1. Modification of existing billing system 2. Chambers for <b>bulk meters for water treatment plants</b>, zonal meters and water pressure sensors <b>Training of the Nigerian Project Personnel</b> 1. Four persons mutually agreed upon will be trained in Japan annually 2. GIS training in Nigeria</p>	<p><b>The Nigerian Side</b> 1. Chief Advisor /NRW Reduction Planning / Water Distribution Management 1 2. Deputy Chief Advisor / NRW Reduction Planning 3. NRW Reduction Operations Management 4. Leakage Detection Technology 5. Commercial Loss 6. Hydraulic Analysis / GIS 7. Procurement Manager / Coordinator 8. Facility Design / Construction Supervision 9. Equipment Design / Installation 10. Water Distribution Management 2 11. Remote Monitoring 12. Other experts mutually agreed upon as necessary</p> <p><b>Equipment</b> 1. Bulk meters and loggers for water treatment plants 2. Water flow meters, valves, and customer meters for SMA 3. Leakage detection equipment for PMA 4. Pipe repair equipment for PMA 5. Vehicles (Pick-ups) 6. Generator for project office 7. Zonal meters, loggers and water pressure sensors 8. Telemetric monitoring system with standby power generating facility for selected zonal meter(s) and/or water pressure sensor(s) 9. Other equipment mutually agreed upon as necessary</p> <p><b>Facilities</b> 1. Modification of existing billing system 2. Chambers for <b>bulk meters for water treatment plants</b>, zonal meters and water pressure sensors <b>Training of the Nigerian Project Personnel</b> 1. Four persons mutually agreed upon will be trained in Japan annually 2. GIS training in Nigeria</p>	<p><b>Japanese Experts</b> A. Natural disaster / political / instability / economic crisis that affect the Project activities do not occur.  B. Pre-Conditions A. Furnished offices for Japanese Experts are secured at the Headquarters and each Pilot Area Office of FCTWB. B. Project Personnel is assigned with the finalized list.</p>	<p><b>Issues &amp; Countermeasures</b> <b>A. Delay of the Project:</b> Available monitoring period of Activities 1-2 to 1-5 will be insufficient due to delay in the Activities. <b>(Cause)</b> - Delay and suspension of the chamber construction for bulk flowmeters and procurement of necessary materials for pilot activities due to non-release of the Counterpart Fund in 2015&amp;2016. - Taking a lot of time to obtain the correct situation due to non-existence of the as-built drawings and the restriction of GIS usage. <b>(Countermeasure)</b> - Extension of the project period based on the request from the Nigerian side. - Taking over the chamber construction and procurement of small materials for Pilot activities from the Nigerian side to the Japanese side based on the request from the Nigerian side. <b>B. SMA out of PMA Monitoring Area:</b> PMA meters were relocated from originally-designed position to other position in Jabi and Garki I due to difficulty in implementation. <b>(Cause)</b> - It was physically difficult to settle the PMA flowmeter and to monitor water flow at the original location, because the distance from the ground level to the location of pipeline was unexpectedly deep in Jabi (SMA1). FCTWB could not supply water to the western area in SMA2 if the Project Team closes the isolating valve at the original location in Garki I (SMA2-1). <b>(Countermeasure)</b> - Removing the SMA out of PMA. Both sides technically confirmed that SMA 1 in Jabi and SMA 2-1 in Garki I are constrained to be out of PMA monitoring area. In order to avoid further delay of the Project activities (Activity 2-8 to 2-16), the Project Team has to remove these SMAs from the target of the Project. - Collecting necessary information from FCDA. FCTWB has to get the necessary information in order to implement the Project activities efficiently.</p>

Note (\*3) Selection criteria of PMA are as follows: (i) Safety for night works is secured in measuring minimum night flow; (ii) Distribution network is separated and it is easy to isolate it in measuring NRW ratio; and (iii) NRW ratio is supposedly high.  
Note (\*4) Working Group for NRW planning would consist of Project Manager (as chair), Deputy Project Manager, Technical Managers, Head of Finance Dept., Head of Production Dept., and members of NRW Management Team.



Project Monitoring Sheet II (Plan of Operations)

PO3  
Version: 3  
Date: 22 Sep 2016

Project Title: The Federal Capital Territory Reduction of Non-Renewable Water Project

Activity	Original Target	We are here.												Remarks	Monitoring	
		Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned			
3.13 Implement NRW reduction operations at each SMA															None	None
3.14 Increase the progress of the NRW reduction operations of each SMA															None	None
3.15 Maintain level of NRW of each SMA at the rest of the response operations															None	None
3.16 Progress a record of response operations															None	None
3.17 Review the NRW reduction operations for each SMA and for the whole network															None	None
3.18 Review the NRW reduction operations for each SMA and for the whole network															None	None
3.19 Review the NRW reduction operations for each SMA and for the whole network															None	None
3.20 Review the NRW reduction operations for each SMA and for the whole network															None	None
3.21 Review the NRW reduction operations for each SMA and for the whole network															None	None
3.22 Review the NRW reduction operations for each SMA and for the whole network															None	None
3.23 Develop and test the reduction strategy plan for the whole network															None	None
3.24 Develop and test the reduction strategy plan for the whole network															None	None
3.25 Develop and test the reduction strategy plan for the whole network															None	None
3.26 Develop and test the reduction strategy plan for the whole network															None	None
3.27 Develop and test the reduction strategy plan for the whole network															None	None
3.28 Develop and test the reduction strategy plan for the whole network															None	None
3.29 Develop and test the reduction strategy plan for the whole network															None	None
3.30 Develop and test the reduction strategy plan for the whole network															None	None

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Activity 1																									
Activity 2																									
Activity 3																									
Activity 4																									
Activity 5																									
Activity 6																									
Activity 7																									
Activity 8																									
Activity 9																									

Activity	Actual	Planned
1. NRW Reduction Planning / Water Distribution Management	100%	100%
2. NRW Reduction Planning / NRW Reduction Planning	100%	100%
3. NRW Reduction Operations Management	100%	100%
4. NRW Reduction Operations Management	100%	100%
5. NRW Reduction Operations Management	100%	100%
6. NRW Reduction Operations Management	100%	100%
7. NRW Reduction Operations Management	100%	100%
8. NRW Reduction Operations Management	100%	100%
9. NRW Reduction Operations Management	100%	100%

**Project Monitoring Sheet II (Plan of Operations)**  
Original Plan, Work Plan, and Revision of Schedule, Actual Works and Progress

**PO3**  
Version: 3  
Date: 22 Sep 2016  
Progress updated: 31st August 2016

Item No	Task Description	Original Target												Actual	Remarks	Task A Commentaries	
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
10	11) Minors BES/VAW														2.50 min month		
	12) Minors BS/CO														0.50 min month		
	13) Minors M/CO														2.50 min month		
	14) Minors M/VAW														None		
	15) Minors M/CO														None		
	16) Minors M/VAW														None		
	17) Minors M/VAW														None		
	18) Minors M/VAW														None		
	19) Minors M/VAW														None		
	20) Minors M/VAW														None		
	21) Minors M/VAW														None		
	22) Minors M/VAW														None		
	23) Minors M/VAW														None		
	24) Minors M/VAW														None		
	25) Minors M/VAW														None		
	26) Minors M/VAW														None		
	27) Minors M/VAW														None		
	28) Minors M/VAW														None		
	29) Minors M/VAW														None		
	30) Minors M/VAW														None		
	31) Minors M/VAW														None		
	32) Minors M/VAW														None		
	33) Minors M/VAW														None		
	34) Minors M/VAW														None		
	35) Minors M/VAW														None		
	36) Minors M/VAW														None		
	37) Minors M/VAW														None		
	38) Minors M/VAW														None		
	39) Minors M/VAW														None		
	40) Minors M/VAW														None		
	41) Minors M/VAW														None		
	42) Minors M/VAW														None		
	43) Minors M/VAW														None		
	44) Minors M/VAW														None		
	45) Minors M/VAW														None		
	46) Minors M/VAW														None		
	47) Minors M/VAW														None		
	48) Minors M/VAW														None		
	49) Minors M/VAW														None		
	50) Minors M/VAW														None		



## List of Equipment for the Project

No.	Equipment	Specification	Procurement in		Quantity		Hand-over	Remarks
			Japan	Nigeria	Plan	Actual		
<b>For Activity 1-2</b>								
1	Ultrasonic flow meter (stationary, 220m)	Ultrasonic pulse transmit time difference method, sensor for 600-1,500mm, 220m cable	✓		2	2	✓	including installation, commissioning and training
2	Ultrasonic flow meter (stationary, 300m)	Ultrasonic pulse transmit time difference method, sensor for 600-1,500mm, 300m cable	✓		2	2	✓	including installation, commissioning and training
3	Data logger (stationary)	Paperless, 6 points, 1s-1h record cycle, 4-20mA, trend, bar graph and historical trend displays	✓		1	1	✓	for the above No.1&2 ultrasonic flow meters
<b>For Activity 1-6</b>								
1	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 10m cable	✓		6	-	Not yet	including installation, commissioning and training
2	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 20m cable	✓		3	-	Not yet	including installation, commissioning and training
3	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 30m cable	✓		2	-	Not yet	including installation, commissioning and training
4	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 40m cable	✓		2	-	Not yet	including installation, commissioning and training
5	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 25-250mm, 10m cable	✓		1	-	Not yet	including installation, commissioning and training
6	Data logger (stationary)	Paperless, 6pts, 1s-1h record cycle, 4-20mA, trend, bar graph and historical trend displays	✓		13	-	Not yet	for the above No.1-5 ultrasonic flow meters
7	Data logger (portable)	2ch (flow and pressure), 1s - 24h record cycle, 4-20mA, 5 years battery life	✓		2	-	Not yet	
8	Remote Monitoring System	Telemetry with transmission, modem/router, container, interface, PC, printer, UPS, server, etc	✓		2	-	Not yet	Pilot system
9	Solar System	80VA, 1.0kW (not yet confirmed)	✓		2	-	Not yet	for the above ultrasonic flow meter
10	Solar System	80VA, 0.3kW (not yet confirmed)	✓		8	-	Not yet	for the above ultrasonic flow meter
11	Solar System	110VA, 0.4kW (not yet confirmed)	✓		1	-	Not yet	for the above ultrasonic flow meter
12	Solar System	110VA, 0.4kW (not yet confirmed)	✓		2	-	Not yet	for the above ultrasonic flow meter and telemetry system
<b>For Activity 2-4 and 2-8</b>								
1	GIS software	Intergraph Geomedia Essential	✓		1	1	✓	Software has been adopted by AGIS. V13.1
2	GIS software	ESRI ArcGIS Basic Version 10.3	✓		1	1	✓	Mainly for data input
3	Plotter (A0)	A0	✓		1	1	✓	
4	GPS terminal	High sensitivity, 2,000pts, 200routes, IPX7, built-in camera (5mega-pixel), USB, nickel hydride battery pack	✓		2	2	✓	Garmin
5	Personal computer	500HD, 4 GB Ram, Windows 7or8, Microsoft Office installed, Mouse	✓		2	2	✓	
6	Anti-virus software		✓		2	2	✓	for the above PCs (No.5)
7	UPS	1.2kVA	✓		2	2	✓	
<b>For Activity 2-5</b>								
1	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 450mm, 20m cable	✓		1	1	✓	
2	Data logger (portable)	2ch (flow and pressure), 1s - 24h record cycle, 4-20mA, 5 years battery life	✓		1	1	✓	for the above No.1 ultrasonic flow meter
3	Flow meter	Dia. 50mm with fittings	✓		-	-	-	
4	Flow meter	Dia. 80mm with fittings	✓		-	-	-	
5	Flow meter	Dia. 100mm with fittings	✓		-	-	-	
6	Flow meter	Dia. 150mm with fittings	✓		0	1	✓	
7	Flow meter	Dia. 200mm with fittings	✓		1	2	✓	
8	Flow meter	Dia. 250mm with fittings	✓		0	0	✓	
9	Flow meter	Dia. 300mm with fittings	✓		3	3	✓	
<b>For Activity 2-7</b>								
1	Sluice valve	Dia. 50mm with fittings	✓		2	0	-	
2	Sluice valve	Dia. 80mm with fittings	✓		0	0	-	
3	Sluice valve	Dia. 100mm with fittings	✓		9	1	✓	
4	Sluice valve	Dia. 150mm with fittings	✓		12	7	✓	
5	Sluice valve	Dia. 200mm with fittings	✓		6	8	✓	
6	Sluice valve	Dia. 250mm with fittings	✓		2	0	✓	
7	Sluice valve	Dia. 300mm with fittings	✓		10	6	✓	
<b>For Activity 2-10</b>								
1	Ultrasonic flow meter (portable)	Ultrasonic pulse transmit time difference method, sensors (small x3, medium x6, large x3)	✓		6	6	✓	
2	Data logger (portable)	2ch (flow and pressure), 1s - 24h record cycle, 4-20mA, 5 years battery life	✓		6	6	✓	
3	Leak noise correlator	Main unit, preamplifier and piezoelectric sensor	✓		2	2	✓	
4	Water leak detector	Acoustic type, piezoelectric sensor	✓		6	6	✓	
5	Non-metal pipe locator	Electromagnetic induction type for plastic pipe (PVC, PE)	✓		3	3	✓	
6	Metal locator	Optical and acoustical output signal, 50cm depth	✓		3	3	✓	
7	Time integral water leak detector	Automatic leak noise determination method	✓		3	3	✓	
8	Acoustic rod	1.5m length	✓		9	9	✓	
9	Distance meter	Max. 10km, 10cm scale	✓		3	3	✓	
10	Hammer drill	Dia. 38mm, 270rpm, 3,000 stroke/min	✓		3	3	✓	
11	Boring bar	Dia. 16mm, 1.0m length	✓		3	3	✓	
12	Drill bit	Dia. 19x800mm	✓		9	9	✓	
13	Portable residual chlorine analyzer	DPD, absorptiometry, 0.02-2.00mg/L	✓		3	3	✓	
14	Metal pipe and cable locator	5m depth	✓		3	3	✓	
15	Reference meter	Portable built-in case type, 13-25mm	✓		3	3	✓	
16	Leakage quantity measurement device	13-25mm	✓		3	3	✓	
17	Personal computer	500HD, 2GB Ram, Windows 7or8, Microsoft Office installed, Mouse	✓		3	3	✓	
18	Anti-virus software		✓		3	3	✓	for the above PCs (No.17)
19	UPS	1.2kVA	✓		3	3	✓	
20	Inkjet printer	A4, Color, All-in-one	✓		3	3	✓	
21	Digital camera	Compact type, Optical zoom, 10 mega-pixel (min), LCD	✓		3	3	✓	
<b>For Activity 2-13</b>								
1	Generator	200V, 6.5kVA	✓		3	3	✓	
2	Asphalt cutter	3600RPM, 13kW	✓		3	3	✓	
3	Concrete breaker		✓		3	3	✓	
4	Small-sized dewatering pump	2"	✓		3	3	✓	
5	Small-sized tamper		✓		3	3	✓	
6	Electric drum	50m	✓		3	3	✓	
7	Customer meter	Dia. 2/3" with fittings, conventional type	✓		(388)	-	Not yet	To be determined through baseline survey.
8	Customer meter	Dia. 1" with fittings, conventional type	✓		(259)	-	Not yet	To be determined through baseline survey.
9	Customer meter	Dia. 50mm with fittings, conventional type	✓		(89)	-	Not yet	To be determined through baseline survey.
10	Customer meter	Dia. 80mm with fittings, conventional type	✓		(23)	-	Not yet	To be determined through baseline survey.
11	Customer meter	Dia. 100mm with fittings, conventional type	✓		(7)	-	Not yet	To be determined through baseline survey.
12	Compact Reciprocating Saw	Pipe cutting	✓		3	3	✓	
<b>For Output 2</b>								
1	Pickup truck for pilot sites		✓		2	2	✓	
<b>For Operation of the Project</b>								
1	Laser printer	A4, B/W	✓		1	1	✓	
2	Inkjet printer	A3, Color	✓		1	1	✓	
3	Multifunction copier	A3, B/W	✓		1	1	✓	
4	Graphic/movie editing software	Windows Movie Maker, Microsoft Powerpoint	✓		1	1	✓	Free or preinstalled softwares to be utilized.
5	Projector	3,000 Lummen, HDMI, VGA, USB port	✓		1	1	✓	

### The Second Training in Japan

**Course Name:** The Federal Capital Territory Reduction of Non-Revenue Water Project (Distribution and Commerce)

**Purpose:**

1. All trainees belonging to both Distribution and Commerce understand system/outline of water supply services in Japan and Yokohama City, and then can compare them with those in Nigeria and FCTWB.
2. Through participation in common lectures, visiting and discussions, all trainees belonging to both Distribution and Commerce understand systems and efforts for operation and maintenance and NRW reduction.
3. Through participation in lectures and visiting related to each area, Distribution or Commerce separately, trainees belonging to each area understand systems, technologies, methodologies and efforts for operation and maintenance and NRW reduction.
4. In consideration of consistency to the action plan proposed by trainees participated in the 1<sup>st</sup> Training in August 2015, more practical and pragmatic action plan for realization is prepared by trainees belonging to both Distribution and Commerce jointly.
5. Eventually, the action plan and their knowledge are fully utilized for implementation of appropriate operation and maintenance and cross-organizational NRW reduction by FCTWB.

**Programme:**

1. Common Subject: Water Supply in Japan, Non-Revenue Water, Self-support Accounting System, Distribution Management, Mapping System (GIS), Yokohama Water Supply Museum, Water Meter, Service Connection & Inspection, Water Supply Facility Development Planning, Medium-Term Management and Financial Planning, Schoolchild Education Activity in Water Treatment Plant
2. Distribution: Facility O&M, Leakage Prevention, Leakage Detection Demonstration, Supervision & Inspection, Water Supply Operation & Management
3. Commerce: Water Tariff, Public Relations, Customer Services, Meter Reading, Human Resources Development

**Period:** 19<sup>th</sup> June to 2<sup>nd</sup> July 2016

**Receiving Water Utility:** Yokohama City Waterworks Bureau

**Participants:** 8 project members (Distribution: 4, Commerce: 4)

Name	Position in the Project	Position in FCTWB
Engr. Abolade Rasaki Lawal	Coordinator, NRW Management Team	Head of Special Projects Unit, Distribution
Mr. Habib Ahmed Kiru	NRW Action Team Leader	Area Manager, Gudu Area Office
Mr. Mohammed Dauda Debo	NRW Management Team member	Technical Officer, Pipeline Unit, Distribution
Mr. Abdulrahman Shehu Sani	Ditto	Senior Technical Officer / Head of Prepaid Meter Unit, Distribution
Mr. Danjumma Isah	Ditto	Chief Commercial Officer, Head of Monitoring and Detection Unit, Commerce
Mr. Shehu Sulaiman	Ditto	Head of GIS, Head of AMR Operations, Distribution / Commerce
Mr. Aliyu Muhammad Maradun	Ditto	Chief Commercial Officer, Head of Major Consumers Unit, Commerce
Mrs. Rose Aniekan Akpan	Ditto	Head of Billing Unit, Commerce

Annex 3 Location of the SMAs to be removed from PMA Monitoring

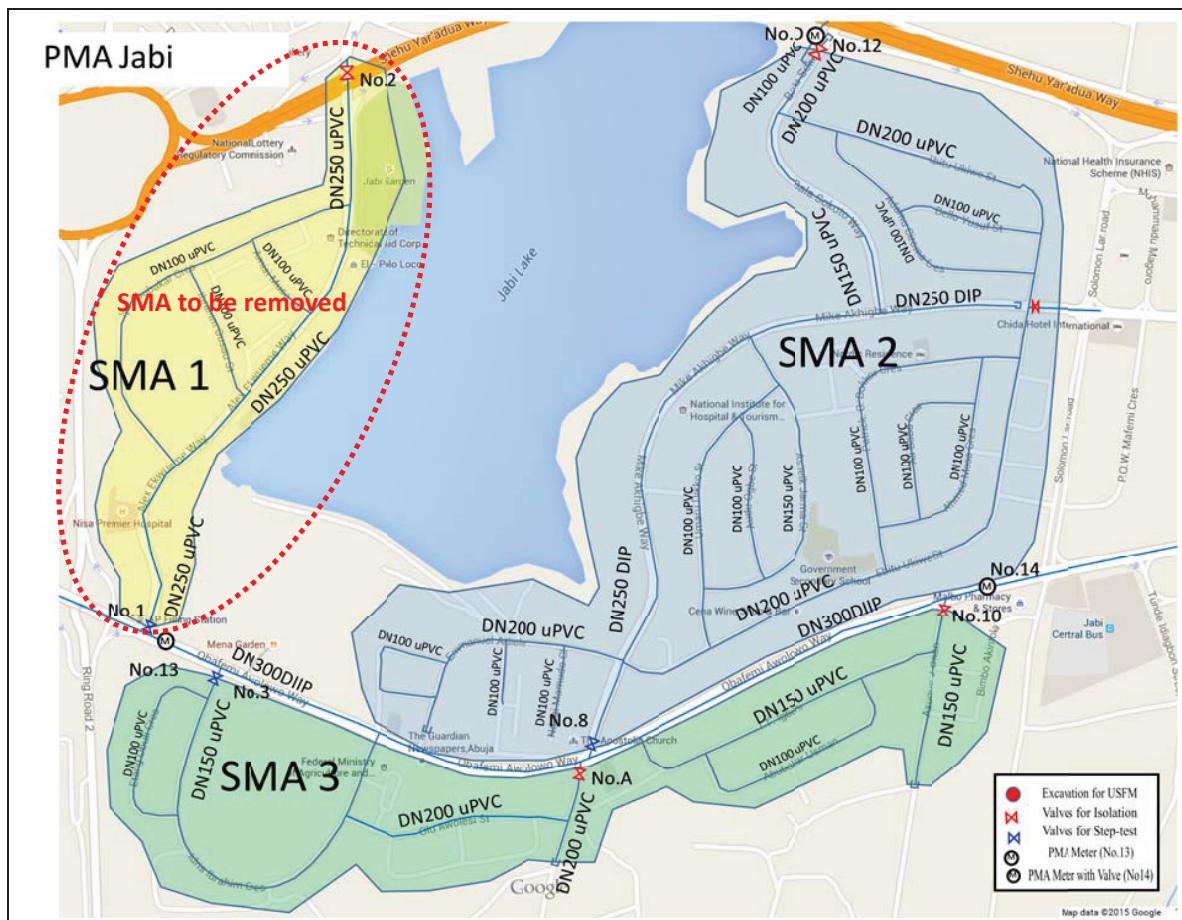


Figure: Location of the SMA to be removed from PMA Monitoring (Jabi)

Annex 3 Location of the SMAs to be removed from PMA Monitoring

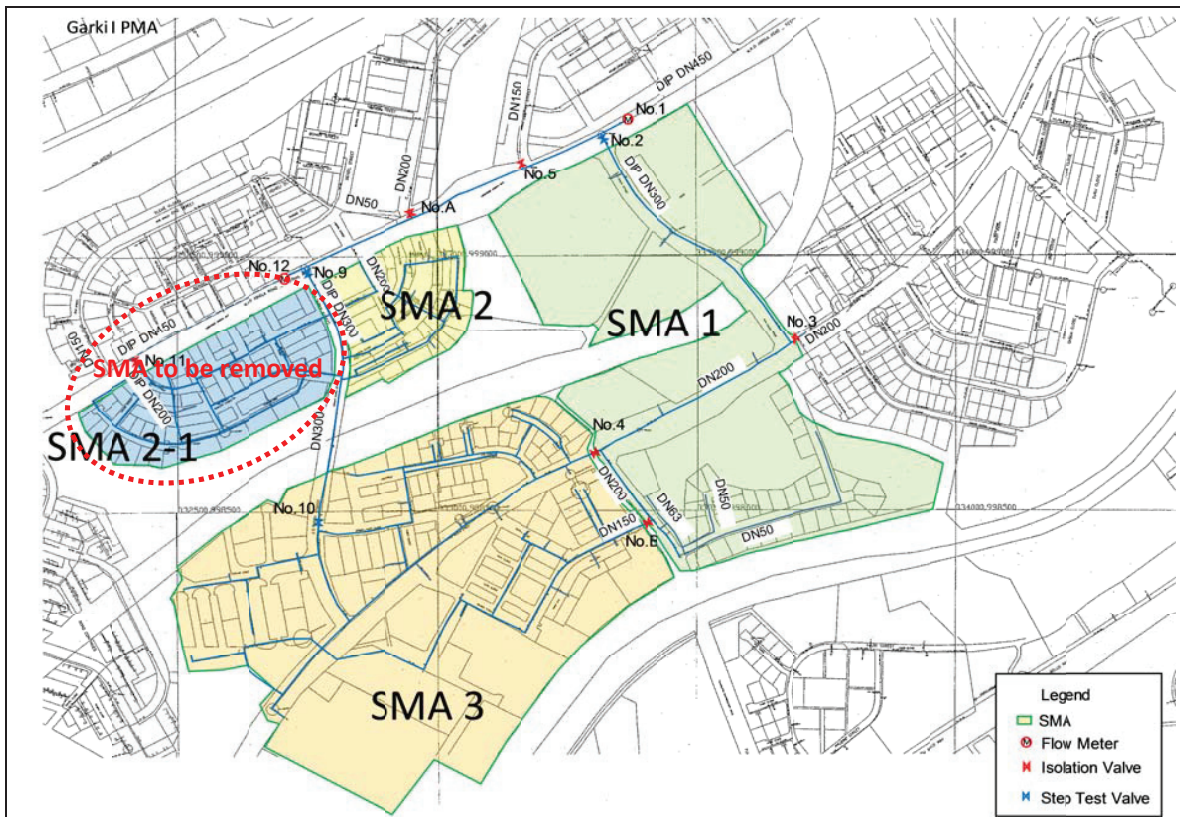


Figure: Location of the SMA to be removed from PMA Monitoring (Garki I)

Annex 4: Participants in Preparation of Monitoring Sheet and Photos

**Participants in Preparation of Monitoring Sheet**

**Day 1: 6<sup>th</sup> September 2016 for Project Monitoring Sheet II**

S/N	NAME	POSITION
1	Nahuche A.A	HOD Distribution (Technical Manager)
2	Adis Muhammed S.	HOD Commerce (Technical Manager)
3	Lawal Abolade R.	Head [Special Projects] (Coordinator)
4	Aminu Umar B.	Head[Ops&Wm]
5	Abdul Yusuf	Sup [P&P]
6	Masaud Abdullahi	Head[metering]
7	Ozumi Abdul	AAM[Dist] Gudu
8	Muhammed A.	Ops&Wm
9	Suleiman Shehu	Head [GIS]
10	Rabiu M.Kabir	Head [Logistics]
11	Dikko Musa	Head[PL/WC]
12	Maradun Aliyu	Head [M.C.O]
13	Adenuga A.O	AM Garki
14	Owolabi I.O	Head Customer Care
15	Sulaiman A. Mulid	AAM[Comm] Jabi
16	Salihu O. Sadiq	AAM[Dist] Jabi
17	Isah Danjuma	Head[Moni/Plaza]
18	Akinori Miyoshi	CA, JICA Expert Team

**Day 2: 7<sup>th</sup> September 2016 for Project Monitoring Sheet II**

S/N	NAME	POSITION
1	Nahuche A.A	HOD Distribution (Technical Manager)
2	Muhammed Adis	HOD Commerce (Technical Manager)
3	Lawal Abolade R.	Head [Special Projects] (Coordinator)
4	Dikko Musa	Head[PL&Wc]
5	Aliyu Maradun	Head [MCO]
6	Adeyemi Taiwo	Head [Emb& Corp]
7	Abdul Yusuf	Sup[P&P]
8	Abdul Ozumi	AAM [Dist] Gudu
9	Shehu Sulaiman	Head GIS
10	Rabiu M.Kabir	Head Logistics
11	Mohammed A	Ops&Wm
12	Moh'd Ramat	AM Jabi
13	Aminu Umar B.	Head[Ops&Wm]
14	Owolabi Isaac	Head[Customer Care]
15	Adenuga A.o	AM Garki
16	Isah Danjuma	Head[Moni/Plaza]
17	Masaud Abdullahi	Head[Metering]
18	Akinori Miyoshi	CA, JICA Expert Team

**Day 3: 8<sup>th</sup> September 2016 for Project Monitoring Sheet I**

S/N	NAME	POSITION
1	S.T. Bello	HOD Admin&Supply (Deputy Project Manager)
2	Nahuche A.A	HOD Distribution (Technical Manager)
3	Adis Muhammed S.	HOD Commerce (Technical Manager)
4	Lawal Abolade R.	Head [Special Projects] (Coordinator)
5	Muhammed A.	Ops&Wm
6	Akinori Miyoshi	CA, JICA Expert Team

Annex 4: Participants in Preparation of Monitoring Sheet and Photos

**Day 4: 19<sup>th</sup> September 2016 for Project Monitoring Sheet Summary**

S/N	NAME	POSITION
1	Hudu Bello	Director (Project Manager)
2	S.T. Bello	HOD Admin&Supply (Deputy Project Manager)
3	Nahuche A.A	HOD Distribution (Technical Manager)
4	Adis Muhammed S.	HOD Commerce (Technical Manager)
5	Lawal Abolade R.	Head [Special Projects] (Coordinator)
6	Rabiu M.Kabir	Head [Logistics]
7	Akinori Miyoshi	CA, JICA Expert Team

**Day 5: 21<sup>st</sup> September 2016 for Project Monitoring Sheet Summary**

S/N	NAME	POSITION
1	S.T. Bello	HOD Admin&Supply (Deputy Project Manager)
2	Nahuche A.A	HOD Distribution (Technical Manager)
3	Adis Muhammed S.	HOD Commerce (Technical Manager)
4	Lawal Abolade R.	Head [Special Projects] (Coordinator)
5	Rabiu M.Kabir	Head [Logistics]
6	Muhammed A.	Ops&Wm
7	Akinori Miyoshi	CA, JICA Expert Team

**Monitoring Mission Members from JICA Headquarters (13<sup>th</sup> to 22<sup>nd</sup> September 2016)**

S/N	NAME	POSITION
1	Yoshiki Omura	Senior Advisor in Urban Water Supply
2	Keisuke Yamagami	Project Officer, Water Resources Group, Global Environment Department

Annex 4: Participants in Preparation of Monitoring Sheet and Photos

**Photos of Preparation of Monitoring Sheet**

	<p><b>Day 1: 6<sup>th</sup> September 2016</b></p> <p>Preparation of Project Monitoring Sheet II (Attendance: NRW Management Team members and Action Team Leaders)</p>
	<p><b>Day 2: 7<sup>th</sup> September 2016</b></p> <p>Preparation of Project Monitoring Sheet II (Attendance: NRW Management Team members and Action Team Leaders)</p>
	<p><b>Day 3: 8<sup>th</sup> September 2016</b></p> <p>Preparation of Project Monitoring Sheet I (Attendance: Deputy Project Manager, Technical Managers and Coordinator)</p>
	<p><b>Day 4: 19<sup>th</sup> September 2016</b></p> <p>Preparation of Project Monitoring Sheet Summary (Attendance: Project Manager, Deputy Project Manager, Technical Managers and Coordinator)</p>





To Chief Representative of JICA Nigeria Office

## PROJECT MONITORING SHEETS

**Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project**

**Version of the Sheet: Ver. 4 (Term covered: September, 2016 - December, 2016)**

**Name: Akinori Miyoshi**

**Title: Chief Advisor**

**Submission Date: 20 December 2016**

### I. Summary

#### 1 Progress

##### 1-1 Progress of Inputs

##### **[The Nigerian Side]**

##### Project Personnel

All project members including Project Director, Project Manager, Deputy Project Manager, Technical Managers, Non-Revenue Water (NRW) Management Team members, NRW Action Team members have been involved in the Project.

##### Land, Building and Facilities

Office spaces and necessary facilities at the Federal Capital Territory Water Board (FCTWB) have been provided for the Japanese side.

Construction of chambers for bulk flowmeters was taken over by the Japanese side due to non-release of the Counterpart Fund as a result of the previous project monitoring in September 2016.

##### Local Costs

Prepaid meters for Pilot Metering Area (PMA) in Gudu Area Office and AMR (Automatic Meter Reading) meters for PMA in Garki I Area Office were procured by the Nigerian side, then installation of the procured water meters has been done.

##### **[The Japanese Side]**

##### JICA Experts

Japan International Cooperation Agency (JICA) Expert Team consisting of a Chief Advisor and members for ten areas of expertise were assigned to the works in Nigeria for 11.1 man-months between September 2016 and December 2016 (67.5 man-months from the commencement of the Project in November 2014).

##### Equipment

Mechanical (conventional) water meters were procured in Nigeria for PMA in Jabi Area Office. See

the Annex-1: List of Equipment for the Project.

Procurement of equipment for water distribution management such as zonal meters, data loggers, telemetric monitoring system, etc. has been in process in Japan.

Facilities

Modification of existing billing system including training to relevant staff in FCTWB was completed. Chamber construction for both bulk and zonal flow meters including cable installation was completed by the Nigerian contractor.

**1-2 Progress of Activities**

**[Activities for Output-1: Level of NRW of both the service area of FCWTB and water distribution areas monitored regularly.]**

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
1-1	Install bulk meters to water treatment plants 1 and 2	Progress: 75%, Behind: 7.5 months Delayed and suspended. Local contractors outsourced by FCTWB have constructed chambers for bulk meters. Construction of three chambers was completed while the fourth one is 50% completed. However, cable installation, ladder and fencing are pending. The construction has been suspended due to non-payment. This is due to non-release of the Counterpart Fund.	Completed. However, data acquisition seems to be not always available, which may be due to not water-filled flow inside pipelines.
1-2	Measure monthly water production of water treatment plants 1, 2, 3, and 4	Progress: 0%, Behind: 7.0 months Delayed as a result of delay in Activity 1-1. After Activity 1-1, the Project needs at least 6 months for monitoring this Activity.	Progress: 0%, Behind: 9.5 months Ready to measure monthly water production but the Project needs at least 6 months for monitoring this Activity.
1-3	Tally the above water production data monthly	Progress: 0%, Behind: 7.0 months Delayed as a result of delay in Activity 1-1 and 1-2. After Activity 1-1 and 1-2, the Project needs at least 6 months for monitoring this Activity.	Progress: 0%, Behind: 9.5 months Ready to measure monthly water production but the Project needs at least 6 months for monitoring this Activity.
1-4	Calculate the monthly water consumption based on the billing data	Progress: 40%, Behind: 7.5 months Delayed. FCTWB has collected information of returned bills and has deactivated them. The returned bills cause inaccuracy of calculating NRW ratio. The final specification for billing system modification was adopted. After modification, the Project needs at least 6 months for monitoring this Activity.	Completed (billing system modification only). Ready to calculate monthly water consumption, but the Project needs at least 6 months for monitoring this Activity.
1-5	Calculate monthly NRW ratio	Progress: 0%, Behind: 7.5 months	Progress: 0%, Behind: 4.5 months

PM Form 3-1 Monitoring Sheet Summary

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
	of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4	Delayed as a result of delay in Activity 1-3 and 1-4. The Project needs at least 6 months for monitoring this Activity after obtaining the data from Activity 1-3 and 1-4.	Ready to calculate monthly NRW ratio, but the Project needs at least 6 months for monitoring this Activity.
1-6	Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system	Progress: 65%, Behind: 1.5 months Being delayed. Planning/designing of zonal meters, BoQ and specifications were completed. Construction of 6 out of 8 chambers was completed by the local contractor outsourced by JICA while the remaining 2 is ongoing. Consistent rain has affected the process of excavation of rock at the chamber site. Construction will continue as soon as favorable weather condition is achievable.	Progress :90%, Behind: 4.5 months Delayed. Construction of chambers for zonal meters was completed Zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system have been procured in Japan.
1-7	Measure and collect data for water distribution management such as water flow of zonal meters and water pressure	Progress: 0%, Behind: 0.0 months The Activity will be implemented after the completion of Activity 1-6.	Progress: 0%, Behind: 4.5 months Delayed as a result of delay in Activity 1-6. The Activity will be implemented after the completion of Activity 1-6.

**[Activities for Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
2-1	Review existing NRW reduction operations at each pilot Area Office	Completed.	Completed.
2-2	Conduct capacity assessment of organization and the relevant staff	Progress: 50%, Behind: 7.0 months Delayed as a result of delay in Activity 2-9 to 2-15. Interim assessment will be done when pilot project terminates.	Completed.
2-3	Identify and select a Pilot Metering Area (PMA) for each Pilot Area Office based on the selection criteria of PMA	Completed.	Completed.
2-4	Prepare/update distribution network drawings for each PMA	Completed. AGIS security has still hindered data import/export and analysis.	Completed. AGIS security has still hindered data import/export and analysis in spite of FCTA PS's instruction.
2-5	Install water flow meters to each PMA and measure in/outflows monthly	Progress: 90%, Behind: 9.0 months Delayed as a result of electrical works for the ultrasonic flow meter to be installed in Garki I.	Completed, but partially and provisionally. Check/repair a PMA meter in Jabi and complete fully electricity

PM Form 3-1 Monitoring Sheet Summary

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
		All mechanical flow meters were procured and installed except the ultrasonic flow meter in Garki I. (Discussion with AEDC is ongoing.) FCTWB will complete electricity connection for the ultrasonic flow meter in Garki I.	connection for the ultrasonic flow meter in Garki I
2-6	Zone each PMA into Sub Metering Areas (SMA)	Completed.	Completed.
2-7	Isolate a SMA by installing valves	Completed.	Completed.
2-8	Update the distribution network drawings for each SMA	Progress: 80%, Behind: 2.0 months Delayed. All existing pipelines, valves and hydrants were captured. Locations of leakage and illegal connections will be captured. AGIS security has still hindered data import/export and analysis.	Completed.
2-9	Measure an initial level of NRW of each SMA	Progress: 75%, Behind: 5.5 months Delayed as a result of different meter types, non-accessibility to meter and complexity in commercial aspects such as customer categories, water tariffs, units and Area Offices for reading, billing systems and automated estimate billing. 24 hrs flow measurement, MNF survey, Step test, Meter error test and Meter reading were completed. 24hrs customer consumption survey, Unbilled authorized customer listing and consumption survey are ongoing.	Completed.
2-10	Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA	Progress: 75%, Behind: 5.5 months Delayed as a result of different meter types, non-accessibility to meter and complexity in commercial aspects such as customer categories, water tariffs, units and Area Offices for reading, billing systems and automated estimate billing. Leakage detection acoustic survey and Illegal connection survey were completed.	Provisionally completed. Re-detection may be done if necessary.
2-11	Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of	Progress: 30%, Behind: 4.5 months Delayed and the Activity has been done provisionally. The plan is under preparation.	Provisionally completed. Revision may be done if necessary.

PM Form 3-1 Monitoring Sheet Summary

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
	Distribution Department		
2-12	Review and approve NRW reduction operation plan of each SMA	Progress: 30%, Behind: 4.5 months Delayed and the Activity has been done provisionally. The plan is under preparation.	Provisionally completed. Revision may be done if necessary.
2-13	Implement NRW reduction operations at each SMA	Progress: 45%, Behind: 4.5 months Delayed and the Activity has been done provisionally. Repair of leakages completed in three PMAs. Meter replacement and installation is ongoing in Gudu.	Provisionally completed. Further operations may be done if necessary.
2-14	Monitor the progress of the NRW reduction operations of each SMA	Progress: 45%, Behind: 4.5 months Delayed and the Activity has been done provisionally. Repair of leakages completed in three PMAs. Meter replacement and installation is ongoing in Gudu.	Provisionally completed. Further monitoring may be done if necessary.
2-15	Measure level of NRW of each SMA at the end of the respective operations	Progress: 0%, Behind: 6.5 months Delayed and the activity follows Activity 2-14.	Provisionally completed. Detailed check and revision may be done if necessary.
2-16	Prepare a report on pilot projects, covering Activity 2-1~2-15	Progress: 0%, Behind: 2.0 months Delayed and the activity follows Activity 2-15.	Provisionally completed. Detailed check may be done if necessary.
2-17	Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers & meter readers), incl. audio visual materials	Progress: 0%, Behind: 2.0 months Delayed and the activity follows the above Activities.	Provisionally completed. Revision may be done if necessary.

**[Activities for Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
3-1	Establish a Working Group for NRW reduction planning	Completed, but will be reviewed in Phase-2.	Completed, but will be reviewed in Phase-2.
3-2	Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB	Completed, but will be reviewed in Phase-2.	Completed, but will be reviewed in Phase-2.
3-3	Conduct hydraulic and water pressure distribution analyses of the pipeline networks	To be implemented in Phase-2. AGIS security may hinder data import/export and analysis.	To be implemented in Phase-2. AGIS security has still hindered data import/export and analysis in spite of FCTA PS's instruction.
3-4	Develop outlines of the medium-term strategic plan and its annual NRW reduction plan (approval by the Director)	To be implemented in Phase-2.	To be implemented in Phase-2.
3-5	Develop the first medium-term strategic plan (2018-2022) for approval by FCTA	To be implemented in Phase-2.	To be implemented in Phase-2.
3-6	Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA	To be implemented in Phase-2.	To be implemented in Phase-2.
3-7	Develop a planning manual for NRW reduction	To be implemented in Phase-2.	To be implemented in Phase-2.
3-8	Review existing plans, activities and implementing structure, etc. related to water distribution management	Progress: 70%, Behind: 7.0 months Delayed as a result of delay in information submission from Area Offices. 6 out of 13 Area Offices submitted the required information. There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances.	Progress: 75%, Behind: 11.0 months Delayed as a result of delay in information submission from Area Offices. 8 out of 13 Area Offices submitted the required information. There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances.
3-9	Establish framework of water distribution management	Progress: 25%, Behind: 0.5 months Being delayed. Water Distribution Management Committee was established and concept was endorsed. There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances.	Progress: 25%, Behind: 4.5 months Delayed as a result of delay in Activity 1-6 and 1-7.

**1-3 Achievement of Output**

**[Output-1: Level of NRW of the service area of FCTWB is monitored regularly.]**

No	Indicator	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
1a	Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first <u>(*replace by "second" in PDM2)</u> year of the Project.	No achievement (delayed). Monthly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-1 to 1-4. In the current schedule, it is expected that monthly NRW ratio will be obtained from Dec. 2016, the first quarter of the third year.	No achievement (delayed). Monthly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-2 to 1-4. In the current schedule, it is expected that monthly NRW ratio will be obtained from the second quarter of the third year.
1b	Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the first <u>(*replace by "second" in PDM2)</u> year of the Project.	No achievement (delayed). Same as the above in Indicator 1a.	No achievement (delayed). Same as the above in Indicator 1a.
1c	Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors <u>(*replace by "Management" in PDM2)</u> of FCTWB from the third quarter of the first <u>(*replace by "second" in PDM2)</u> year of the Project.	No achievement (delayed). Quarterly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-1 to 1-4. In the current schedule, it is expected that quarterly NRW ratio will be obtained from Mar. 2017, the second quarter of the third year.	No achievement (delayed). Quarterly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-2 to 1-4. In the current schedule, it is expected that quarterly NRW ratio will be obtained from Mar. 2017, the second quarter of the third year.
1d	Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department from the first quarter of the third year of the Project.	No achievement (as planned).	No achievement (as planned).

**Verification of Achievement and Implementing Process**

Although a critical problem particularly delay in chamber construction for bulk flowmeters under Activity 1-1 was solved by taking-over by the Japanese side and also modification of billing system was completed, monthly NRW ratio has not been ready.

So, the Project has not achieved Indicator 1a, 1b and 1c, and need monitoring period for six months.

There are no problems in the implementing process since the previous project monitoring.

**[Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

No	Indicator	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)																																												
2a	Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations.	No achievement (delayed). Although time frame is not specified, this indicator has not been obtained, this mean delayed. In the current schedule, it is expected that this indicator will be obtained from Oct. 2016, the first quarter of the third year.	Most of results did not reach the target level. Provisional NRW Ratio (%) <table border="1"> <thead> <tr> <th></th> <th>Before</th> <th>After</th> <th>Change</th> </tr> </thead> <tbody> <tr> <td colspan="4">Gudu</td> </tr> <tr> <td>SMA-1</td> <td>52.0</td> <td>62.9</td> <td>+10.9</td> </tr> <tr> <td>SMA-2</td> <td>53.9</td> <td>49.0</td> <td>-4.9</td> </tr> <tr> <td colspan="4">Jabi</td> </tr> <tr> <td>SMA-2</td> <td>47.6</td> <td>48.0</td> <td>+0.4</td> </tr> <tr> <td>SMA-3</td> <td>86.4</td> <td>67.2</td> <td>-19.2</td> </tr> <tr> <td colspan="4">Garki I</td> </tr> <tr> <td>SMA-1</td> <td>86.6</td> <td>82.9</td> <td>-3.7</td> </tr> <tr> <td>SMA-2</td> <td>79.0</td> <td>85.0</td> <td>+6.0</td> </tr> <tr> <td>SMA-3</td> <td>68.8</td> <td>41.8</td> <td>-27.0</td> </tr> </tbody> </table> Detailed re-check of results and follow up activities to achieve the target level are immediately necessary by utilizing lessons and learnt.		Before	After	Change	Gudu				SMA-1	52.0	62.9	+10.9	SMA-2	53.9	49.0	-4.9	Jabi				SMA-2	47.6	48.0	+0.4	SMA-3	86.4	67.2	-19.2	Garki I				SMA-1	86.6	82.9	-3.7	SMA-2	79.0	85.0	+6.0	SMA-3	68.8	41.8	-27.0
	Before	After	Change																																												
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2b	Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project.	No achievement (as planned).	Technical manuals were prepared and provisionally approved. Revision may be necessary.																																												
<p><b>Verification of Achievement and Implementing Process</b></p> <p>In spite of existence of different meter types, non-accessibility to meter and complexity in commercial aspects such as customer categories, water tariffs, Units and Area Offices for reading, billing systems and automated estimate billing, the Project completed all activities for Output-2.</p> <p>However, some activities need to be followed up in Phase-2 of the Project because some decrease rate of NRW ratio did not reach to criteria of Indicator 2a.</p> <p>There are no problems in the implementing process since the previous project monitoring.</p>																																															



**[Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

No	Indicator	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
3a	By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval.	No achievement (as planned).	No achievement (as planned).
3b	By October 2017, an annual NRW reduction plan (2018) is incorporated in FCWTB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval.	No achievement (as planned).	No achievement (as planned).
3c	A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project.	No achievement (as planned).	No achievement (as planned).
3d	By November 2016, framework of water distribution management is established.	No achievement (as planned).	No achievement (delayed). Framework has not been ready due to delay in Activity 1-6 and 1-7.
<p><b>Verification of Achievement and Implementing Process</b></p> <p>Indicator 3a, 3b and 3c and related activities for Output-3 are subject to Phase 2 of the Project, which is scheduled to be implemented from January 2017.</p> <p>Activities related to Indicator 3d are in progress with participation of all Area Offices; however, it has taken time to collect information.</p>			

**1-4 Achievement of the Project Purpose**

**[Project Purpose: Capacity of FCTWB for NRW reduction is strengthened.]**

No	Indicator	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
a	The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.	No achievement (as planned).	No achievement (as planned).
b	NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB.	No achievement (as planned).	No achievement (as planned).
c	Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with	Ongoing. Skills and knowledge necessary for NRW reduction, such as minimum night flow survey, step test, leakage detection, meter error test for water	Ongoing. Results of interim capacity assessment in Nov.-Dec. 2016 show that capacity developed has not reached to the criteria. Follow-up

## PM Form 3-1 Monitoring Sheet Summary

No	Indicator	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
	skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level.	balance analysis has been developed through lectures, OJT and the second training in Japan in Jun.-Jul. 2016.	capacity development is necessary in Phase-2 of the Project.
d	NRW ratio of each PMA in the last quarter of the Project reaches its respective target (**). Note(**):Target for each PMA is expected to be determined by the end of the first quarter of the second year.	No achievement (as planned).	No achievement (as planned).
<p><b>Verification of Achievement and Implementing Process</b></p> <p>Budget constraint of the Nigerian side is a possible obstructive factor against achievement of project purpose, particularly Indicator b.</p> <p>Achievement in Indicator c resulted from the activities for Output-2. The Project has developed capacity but achievement is limited because the various conditions revealed and lack of counterpart fund have hindered smooth implementation expected by the Project, then the activities lacked continuity.</p> <p>FCTWB is willing to expand NRW reduction into the whole service area, and the necessity of cross-departmental function for NRW reduction such as task force is being recognized gradually.</p>			

### 1-5 Changes of Risks and Actions for Mitigation

Due to collapse in oil prices and shrinking revenue, recent budget constraint of the Nigerian side including non-release of the Counterpart Fund has corresponded to an important assumption “A. Natural disaster / political instability / economic crisis that affect the Project activities do not occur.” However, as an action discussed in the previous project monitoring, taking over chamber construction and procurement of small materials for Pilot activities by Japanese side, which response to request from the Nigerian side, has mitigated this risk.

### 1-6 Progress of Actions undertaken by JICA

The JICA Expert Team completed chamber construction and procured small materials for Pilot activities.

### 1-7 Progress of Actions undertaken by Nigerian side

FCTWB cooperated with the JICA Expert Team for smooth taking over and implementation of chamber construction. As of 15<sup>th</sup> December 2016, the Counterpart Fund was released eventually, but it was too late to make up for delay of the Project.

### 1-8 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

**(1) Legal Instrument (Enabling Law) establishing FCTWB**

Legal instrument (enabling law) establishing FCTWB as an autonomous body has not yet been approved by the current National Assembly.

To carry it forward, FCTWB suggested conducting joint (FCTWB-JICA) feasibility study to bring out benefits of an autonomous FCTWB as part of the Project.

**(2) Grant Aid Project by Japan**

Under the further agreement between two Governments, “The Project for Introduction of Clean Energy by Solar Electricity Generation System” for Lower Usuma Water Treatment Plants has been expanded/extended with construction of additional facilities. This contributes further to stable water supply to customers of FCTWB.

**(3) Situation of Actions raised in previous Monitoring in September 2016**

(3)-1: Action for “Assignment of Counterparts”

Considering sustainability of implementing NRW reduction based on a NRW reduction strategic plan to be prepared through Output 3 activities, it may be necessary for the Nigerian side to enhance project management skill for working level staff such as Head of Unit for example. Such project management skill should be enhanced through the Project activities. In addition, the existing operational structure should be reviewed.

Situation: There is no change, but the Project will discuss in the beginning of Phase-2 of the Project.

(3)-2: Action for “Involvement of Relevant Organizations”

FCTA has been involved well in the Project as the chair of Joint Coordination Committee (JCC) and also has assisted and advised the Project in dealing with issues including the Counterpart Fund and AGIS security.

Situation: FCTWB has tried to involve AGIS for removal/relaxation of GIS security since FCTA's Permanent Secretary instructed to solve issues. Although AGIS agreed to relax the security, but there is no concrete action by AGIS, accordingly no improvement in GIS of FCTWB.

**(4) Situation of Actions for Other Issues related to Project Implementation Process and from the Technical Aspect in previous Monitoring in September 2016**

(4)-1: Action for “Communication between Distribution Department and Commerce Department”

The JICA Expert Team reported that Distribution Department and Commerce Department have to implement the cross-cutting activities for NRW reduction. Both Departments understand the importance of collaboration and active communication; however they need

to collaborate more to the success of the Project. Also, active participation of Commerce Staff (FCTWB Headquarters) particularly in the field activities is a key to success of the Project and improvement in water supply services.

Situation: FCTWB and the JICA Expert Team have discussed cross-cutting organizational structure among Distribution Department, Commerce Department and Area Offices for effective planning and implementation of NRW reduction from Phase-2 of the Project. This will be concluded in the beginning of Phase-2 based on lessons and learnt obtained from Phase-1.

(4)-2: Action for “Necessity for Strengthening Partnership between FCDA and FCTWB”

It is necessary for FCTWB to obtain the updated as-built drawings and information correctly and timely for proper operation, maintenance and implementing NRW reduction activities efficiently. However, FCWB has not been able to obtain the updated as-built drawings and information in respect of its operation and maintenance activities from FCDA that is in charge of provision of infrastructure. This is as a result of lack of feedback system between the two sister agencies. So, FCTWB is encouraged to always share its operation and maintenance experiences with FCDA while FCDA is equally advised to carry along FCTWB in its water project implementation.

Situation: The Project has communicated officially/bilaterally with FCDA for setting up further relationship and information sharing. The Project will carry on communication in Phase-2.

(4)-3: Action for “Lack of the Quality Management”

Quality of information and performance as well as quality of constructed facilities is not properly managed by FCTWB. It is very important to pay attention to quality management in order to enhance the Project outcome with adequate performance, avoid further delay of the Project and keep sustainability through proper operation and maintenance.

Situation: There is no remarkable improvement since the previous joint monitoring, but the Project will keep focusing on this issue for improvement in Phase-2.

(4)-4: Action for “Prepaid Meter”

Unless systematic cares are taken by FCTWB, use of prepaid meters is critical in terms of NRW reduction and the financial aspect of FCTWB.

Situation: The Project assembled information on different types of existing meters including prepaid meters from relevant Units and Area Offices and discussed them among project members, and will keep discussing further based on the results of Activities for Output-2.

## 2 Delay of Work Schedule and/or Problems (if any)

**2-1 Detail**

**(1) Delay of the Project (Output-1)**

Same as a result of the previous project monitoring, the Project has still delayed for six (6) months from the original plan of operation as of the end of Phase-1 of the Project, and also Project needs a certain time frame to monitor the monthly water production, consumption and NRW ratio. Without the monitoring of them, the Project cannot make a realistic NRW reduction strategic plan through the activities of Output 3, so that it is indispensable for securing the Project's outcome.

Available monitoring period of Activities 1-2 to 1-5 is insufficient, so the Project needs at least six months for monitoring the Activities 1-2 to 1-5.

**(2) Data Acquisition by Bulk Flowmeters (Output-1)**

Through commissioning of ultrasonic flow meters as bulk flowmeters, the Project found out that data acquisition seems to be not always available, which may be due to not water-filled flow inside pipelines and should be solved as soon as possible.

**(3) Less-than-successful Results of the Project (Output-2)**

A series of activities and operations for NRW reduction in PMAs/SMAs were completed, however should be followed up and monitored because decrease in NRW ratio in some SMAs resulted in less-than-successful.

**Table Decrease in NRW Ratio (Provisional)**

	Before (%)	After (%)	Decrease Points in NRW Ratio
<b>Gudu</b>			
SMA-1	52.0	62.9	+10.9
SMA-2	53.9	49.0	-4.9
<b>Jabi</b>			
SMA-2	47.6	48.0	+0.4
SMA-3	86.4	67.2	-19.2
<b>Garki I</b>			
SMA-1	86.6	82.9	-3.7
SMA-2	79.0	85.0	+6.0
SMA-3	68.8	41.8	-27.0

**2-2 Cause**

**(1) Delay of the Project (Output-1)**

The chamber construction for bulk flowmeters and procurement of necessary materials for pilot activities, which had delayed and suspended due to non-release of the Counterpart Fund in 2015&2016, were sorted out by JICA's intervention, particularly taking over chamber construction based on request from the Nigerian side. However, Activities 1-2 to 1-5 are still behind the schedule.

**(2) Data Acquisition by Bulk Flow Meter (Output-1)**

Possible causes are: interference by water flow from new water treatment plant (No.3&4) to water flow from old plant (No.1&2), not-well-planned operation with securing water level in clear water tanks and so on.

**(3) Less-than-successful Results of the Project (Output-2)**

Detailed re-check is necessary, but there are possible reasons of unsuccessful/unexpected results of decrease NRW ratio:

- Frequent change of conditions which are supposed to be not changed, during activities between baseline measurement and ex-post measurement such as:  
Late-identified additional or missing customers and major consumers,  
Late-identified existence or non-existence of pipeline and extension, malfunctioning valves,  
Late-identified difference between PMA/SMA design based on as-built drawings (if any) or information from staff and actual situation
- Difficulty in obtaining a certain number for effective data for water balance analysis, particularly water consumption by water meter reading, which may cause unreliability of analysis.
- Measurement of water flow and water meter reading for a short interval of time such as daily or weekly are sensitive to irregular situation and errors, and it affects directly calculation of NRW ratio.
- Reoccurrence of NRW (leakage, illegal connection) in the long period among baseline measurement, NRW reduction operations and ex-post measurement.

**2-3 Action to be taken**

**(1) Delay of the Project (Output-1)**

In the previous project monitoring, the Nigerian side requested to the Japanese side to extend the project period in order to secure the necessary time frame to monitor the monthly water production, consumption and NRW ratio. JICA headquarters approved the previous monitoring sheets and considered completion of chamber construction for bulk flowmeters which was taken over by Japanese side, so the Project period will be extended for six months

for monitoring the Activities 1-2 to 1-5.

**(2) Data Acquisition by Bulk Flowmeters (Output-1)**

The Project needs immediately to monitor water flow, investigate causes and find possible solutions through discussion among relevant Departments and Units.

**(3) Less-than-successful Results of the Project (Output-2)**

The Project needs immediately detailed re-check of results/data, continuous and further activities to reduce NRW to a certain degree as follow-up activities in Phase-2 of the Project by utilizing lessons and learnt in Phase-1.

However, on the condition that FCTWB improves fundamentals of water supply services such as as-built drawings and complexity in commercial aspects including various customer categories, water tariffs, Units and Area Offices for reading, NRW reduction can be an effective solution for water supply services of FCTWB.

**2-4 Roles of Responsible Persons/Organization**

**[Nigerian Side]**

**(1) Delay of the Project (Output-1)**

After the discussion on the draft amendment of R/D, the Nigerian side signs the amendment.

**(2) Data Acquisition by Bulk Flowmeters (Output-1)**

FCTWB needs immediately to monitor water flow, investigate causes and find possible solutions through discussion among relevant Departments and Units.

**(3) Less-than-successful Results of the Project (Output-2)**

FCTWB repeats immediately Activity 2-10 to 2-15 to reduce NRW to a certain degree as follow-up activities.

**[Japanese Side]**

**(1) Delay of the Project (Output-1)**

The Japanese side prepares the draft amendment of Record of Discussion (R/D) to extend the Project period. After the discussion on the draft amendment of R/D, the Japanese side signs the amendment.

**(2) Data Acquisition by Bulk Flowmeters (Output-1)**

JICA Expert Team supports FCTWB to monitor water flow, investigate causes and find possible solution through discussion among relevant Departments and Units.

**(3) Less-than-successful Results of the Project (Output-2)**

JICA Expert Team re-checks closely results and supports FCTWB to repeat Activity 2-10 to 2-15 to reduce NRW to a certain degree as follow-up activities.

**3 Modification of the Project Implementation Plan**

**3-1 Plan of Operation**

Now that chamber construction for bulk flowmeters was completed, as discussed in the previous project monitoring, based on the request from the Nigerian side, the extension of Project period is considered by the Japanese side to secure the necessary time frame for the monitoring period for the monthly water production, consumption and NRW ratio.

**3-2 Other modifications on detailed implementation plan**

Both sides will amend Record of Discussion (R/D) to extend the Project period for six (6) months. (Remarks: The amendment of R/D and PDM (title of the project, duration, project site(s), target group(s), implementation structure, overall goal, project purpose, outputs, activities, and input) should be authorized by JICA headquarters. If the Project Team deems it necessary to modify any part of R/D and PDM, the Team may propose the draft.)

**4 Preparation by Nigerian side toward after completion of the Project**

To be considered.

**II. Project Monitoring Sheet I & II (as attached)**

**Annex**

Annex-1: List of Equipment for the Project

Annex-2: Participants in Preparation of Project Monitoring Sheets and Photos



**Project Monitoring Sheet I (Revision of Project Design Matrix)**

**Project Title:** The Federal Capital Territory Reduction of Non-Revenue Water Project

**Project Period:** October 2014 to March 2018

**Implementing Organization:** Federal Capital Territory Administration (FCTA) / Federal Capital Territory Water Board (FCTWB)

**Direct Beneficiaries:** FCTWB, relevant staff of FCTWB Headquarters and pilot Area Offices

**Project Site:** FCT Pilot Area Offices: Jabi, Garki I and Gudu

**Version** 3

**Dated** 22 Sep. 2016

Monitoring: 20 Dec. 2016

Narrative Summary		Objectively Verifiable Indicators		Means of Verification	Important Assumption	Achievement	Remarks
<p><b>&lt;Overall Goal&gt;</b> Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB</p>	<p><b>&lt;Project Purpose&gt;</b> Capacity of FCTWB for NRW reduction is strengthened</p>	<p><b>1.</b> Annual NRW ratio is reduced to X% (*) at the end of the year 2021</p> <p>Note (*): Target value (X%), which is expected to be determined in the medium-term strategic plan for NRW reduction, shall be tentatively filled when the final draft was approved by the Director of FCTWB, which shall be finalized when the plan is approved by FCTA</p> <p><b>2.</b> The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.</p> <p><b>3.</b> NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB.</p> <p><b>4.</b> Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level.</p> <p><b>5.</b> NRW ratio of each PMA in the last quarter of the Project reaches its respective target (**).</p> <p>Note (**): Target for each PMA is expected to be determined by the end of the first quarter of the second year.</p>	<p><b>1a.</b> Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the second year of the Project.</p> <p><b>1b.</b> Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the second year of the Project.</p> <p><b>1c.</b> Quarterly NRW ratio of the service area of FCTWB is reported to Management of FCTWB from the third quarter of the second year of the Project.</p> <p><b>1d.</b> Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department from the first quarter of the third year of the Project.</p>	<p><b>1a.</b> Record of NRW ratio kept by Distribution Department</p> <p><b>1b.</b> Date of approval of the plan</p> <p><b>1c.</b> Result of monitoring by NRW Management Team</p> <p><b>1d.</b> Results of joint assessment based on the criteria set by the Project</p> <p><b>1e.</b> Record of NRW ratio kept by Distribution Department</p>	<p><b>A.</b> Policy support for NRW reduction is not discontinued</p> <p><b>B.</b> Natural disaster/ political instability/ economic crisis that affect the service area of FCTWB do not occur</p> <p><b>C.</b> Activities to implement the medium-term strategic plan are not discontinued or delayed</p>	<p>None.</p>	
<p><b>&lt;Outputs&gt;</b> 1. Level of NRW of both the service area of FCTWB and water distribution areas is monitored regularly</p>	<p><b>2a.</b> Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations.</p> <p><b>2b.</b> Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project.</p>	<p><b>1a.</b> Monthly record of NRW ratio</p> <p><b>1b.</b> Material for meetings submitted by the Distribution Department</p> <p><b>1c.</b> Periodic records of data on water distribution management</p>	<p><b>2a.</b> Record of NRW ratio kept by the Distribution Department</p> <p><b>2b.</b> Date of approval of the manuals</p>	<p><b>A.</b> Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers</p>	<p>Indicator <b>1a</b> &amp; <b>1b</b> &amp; <b>1c</b>: None and delayed as a result of delay in Activities 1-2 to 1-5.</p> <p>Indicator <b>1d</b>: None</p>		
<p><b>2.</b> Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices (*1)</p>	<p><b>3a.</b> By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval.</p> <p><b>3b.</b> By October 2017, an annual NRW reduction plan (2018) is incorporated in FCTWB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval.</p> <p><b>3c.</b> A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project.</p> <p><b>3d.</b> By November 2016, framework of water distribution management is established.</p>	<p><b>2a.</b> Record of NRW ratio kept by the Distribution Department</p> <p><b>2b.</b> Date of approval of the manuals</p> <p><b>3a</b> &amp; <b>3b.</b> Date of official letter submitting draft strategic plan and annual recurrent and capital plan</p> <p><b>3c.</b> Date of approval of the manual</p> <p><b>3d.</b> Implementing structure and workflow of water distribution management</p>	<p><b>2a.</b> Most of results did not reach target level. Follow up activities to achieve the target level are necessary by utilizing lessons and learnt.</p> <p>Indicator <b>2b</b>: Technical manuals were prepared and provisionally approved.</p> <p>Indicator <b>3a</b>: None.</p> <p>Indicator <b>3b</b>: None.</p> <p>Indicator <b>3c</b>: None.</p> <p>Indicator <b>3d</b>: Framework has not been ready due to delay in Activity 1-6 and 1-7.</p>				

Note (\*1): NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection  
 Note (\*2): A medium-term strategic plan is a five-year plan, which may include medium-term target, strategies and actions, timeframe, human resource requirement, on-the-job training mechanism, cost-benefit analysis of NRW reduction, etc. It is noted that NRW components addressed by the strategic plan are not limited to the ones mentioned in (\*1) above; they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

Activities	Inputs	The Nigerian Side	The Japanese Side	Important Assumption
<p>1-1 Install bulk meters to water treatment plants 1 and 2</p> <p>1-2 Measure monthly water production of water treatment plants 1, 2, 3 and 4</p> <p>1-3 Tally the above water production data monthly</p> <p>1-4 Calculate the monthly water consumption based on the billing data</p> <p>1-5 Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4</p> <p>1-6 Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system</p> <p>1-7 Measure and collect data for water distribution management such as water flow of zonal meters and water pressure</p> <p>2-1 Review existing NRW reduction operations at each pilot Area Office</p> <p>2-2 Conduct capacity assessment of the relevant staff of each pilot Area Office</p> <p>2-3 Identify and select a Pilot Metering Area (PMA) for each pilot Area Office based on the selection criteria of PMA(*)</p> <p>2-4 Prepare/update distribution network drawings for each PMA</p> <p>2-5 Install water flow meters to each PMA and measure in/outflows monthly</p> <p>2-6 Zone each PMA into Sub Metering Areas (SMA)</p> <p>2-7 Isolate a SMA by installing valves</p> <p>2-8 Update the distribution network drawings for each SMA</p> <p>2-9 Measure an initial level of NRW of each SMA</p> <p>2-10 Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA</p> <p>2-11 Develop a NRW reduction operation plan of each SMA including reduction target, for review by Head of Distribution Department</p> <p>2-12 Review and approve NRW reduction operation plan of each SMA</p> <p>2-13 Implement the NRW reduction operations at each SMA</p> <p>2-14 Monitor the progress of the NRW reduction operations of each SMA</p> <p>2-15 Measure level of NRW of each SMA at the end of the respective operations</p> <p>2-16 Prepare a report on pilot projects, covering Activity 2-1-2-15</p> <p>2-17 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials</p>	<p><b>Project Personnel</b></p> <p>1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA</p> <p>2. Project Manager: Director of FCTWB</p> <p>3. Deputy Project Manager: HoD for Administration and Supply/FCTWB</p> <p>4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce /FCTWB</p> <p>5. Members of NRW Management Team (FCTWB):</p> <ul style="list-style-type: none"> <li>- Head of Special Project Unit of Distribution Department (as Coordinator)</li> <li>- Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department</li> </ul> <p>6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS)</p> <p>7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office</p> <p>8. Other personnel mutually agreed upon as necessary</p> <p><b>Land, Building and Facilities</b></p> <p>1. Office building and facilities necessary for the implementation of the Project</p> <p>2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each pilot Area Office, including internet connection and air conditioners</p> <p>3. Chambers for flow meters and valves for the selected PMAs/SMAs.</p> <p>4. Electric wiring to bulk/zonal meters, loggers and pressure sensors.</p> <p>5. Other facilities mutually agreed upon as necessary</p> <p><b>Local Costs</b></p> <p>1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs</p> <p>2. Administration and operational costs, including cost for local travel for the Project Personnel, demurrage at local customs point, licensing cost of radio application and cost for communication of telemetric device for selected zonal meter (s) and water pressure sensor(s)</p> <p>3. Other costs mutually agreed upon as necessary</p>	<p><b>The Nigerian Side</b></p> <p><b>Project Personnel</b></p> <p>1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA</p> <p>2. Project Manager: Director of FCTWB</p> <p>3. Deputy Project Manager: HoD for Administration and Supply/FCTWB</p> <p>4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce /FCTWB</p> <p>5. Members of NRW Management Team (FCTWB):</p> <ul style="list-style-type: none"> <li>- Head of Special Project Unit of Distribution Department (as Coordinator)</li> <li>- Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department</li> </ul> <p>6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS)</p> <p>7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office</p> <p>8. Other personnel mutually agreed upon as necessary</p> <p><b>Land, Building and Facilities</b></p> <p>1. Office building and facilities necessary for the implementation of the Project</p> <p>2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each pilot Area Office, including internet connection and air conditioners</p> <p>3. Chambers for flow meters and valves for the selected PMAs/SMAs.</p> <p>4. Electric wiring to bulk/zonal meters, loggers and pressure sensors.</p> <p>5. Other facilities mutually agreed upon as necessary</p> <p><b>Local Costs</b></p> <p>1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs</p> <p>2. Administration and operational costs, including cost for local travel for the Project Personnel, demurrage at local customs point, licensing cost of radio application and cost for communication of telemetric device for selected zonal meter (s) and water pressure sensor(s)</p> <p>3. Other costs mutually agreed upon as necessary</p>	<p><b>The Japanese Side</b></p> <p><b>Japanese Experts</b></p> <p>1. Chief Advisor / NRW Reduction Planning / Water Distribution Management 1</p> <p>2. Deputy Chief Advisor / NRW Reduction Planning</p> <p>3. NRW Reduction Operations Management</p> <p>4. Leakage Detection Technology</p> <p>5. Commercial Loss</p> <p>6. Hydraulic Analysis / GIS</p> <p>7. Procurement Manager / Coordinator</p> <p>8. Facility Design / Construction Supervision</p> <p>9. Equipment Design / Installation</p> <p>10. Water Distribution Management 2</p> <p>11. Remote Monitoring</p> <p>12. Other experts mutually agreed upon as necessary</p> <p><b>Equipment</b></p> <p>1. Bulk meters and loggers for water treatment plants</p> <p>2. Water flow meters, valves, and customer meters for SMA</p> <p>3. Leakage detection equipment for PMA</p> <p>4. Pipe repair equipment for PMA</p> <p>5. Vehicles (Pick-ups)</p> <p>6. Generator for project office</p> <p>7. Zonal meters, loggers and water pressure sensors</p> <p>8. Telemetric monitoring system with standby power generating facility for selected zonal meter(s) and/or water pressure sensor(s).</p> <p>9. Other equipment mutually agreed upon as necessary</p> <p><b>Facilities</b></p> <p>1. Modification of existing billing system</p> <p>2. Chambers for bulk meters for water treatment plants, zonal meters and water pressure sensors</p> <p><b>Training of the Nigerian Project Personnel</b></p> <p>1. Four persons mutually agreed upon will be trained in Japan annually</p> <p>2. GIS training in Nigeria</p>	<p><b>Important Assumption</b></p> <p>A. Natural disaster / political / instability / economic crisis that affect the Project activities do not occur.</p> <p><b>Pre-Conditions</b></p> <p>A. Furnished offices for Japanese Experts are secured at the Headquarters and each Pilot Area Office of FCTWB.</p> <p>B. Project Personnel is assigned with the finalized list.</p> <p style="text-align: center;"><b>Issues &amp; Countermeasures</b></p> <p><b>(1) Delay of the Project (Output-1)</b></p> <p><b>ISSUE</b></p> <p>Available monitoring period of Activities 1-2 to 1-5 is insufficient, so the Project needs at least six months for monitoring the Activities 1-2 to 1-5.</p> <p><b>Countermeasures</b></p> <p>The Project period will be extended for six months for monitoring the Activities 1-2 to 1-5.</p> <p><b>(2) Data Acquisition by Bulk Flow Meter (Output-1)</b></p> <p><b>ISSUE</b></p> <p>The Project found out that data acquisition is not always available, which may be due to not water-filled flow inside pipelines and should be solved as soon as possible.</p> <p><b>Countermeasures</b></p> <p>The Project needs immediately to investigate causes, find possible solutions through discussion among relevant Departments and Units.</p> <p><b>(3) Less-than-successful Results of the Project (Output-2)</b></p> <p><b>ISSUE</b></p> <p>A series of activities for NRW reduction in PMAs/SMAs were completed, however should be followed up and monitored because decrease in NRW ratio in some SMAs resulted in less-than-successful.</p> <p><b>Countermeasures</b></p> <p>The Project needs immediately detailed re-check of results/data, continuous and further activities to reduce NRW to a certain degree as follow-up activities by utilizing lessons and learnt in Phase-1.</p>

Note (\*) Selection criteria of PMA are as follows: (i) Safety for night works is secured in measuring minimum night flow; (ii) Distribution network is separated and it is easy to isolate it in measuring NRW ratio; and (iii) NRW ratio is supposedly high.

Note (\*\*) Working Group for NRW planning would consist of Project Manager (as chair), Deputy Project Manager, Technical Managers, Head of Finance Dept., Head of Production Dept., Head of PRRS Unit, and members of NRW Management Team.

**Project Monitoring Sheet II (Plan of Operations)**  
 Plan of Schedule and Actual Work Period  
 As of the end of Dec. 2016

Activities	2014												2015												2016												2017												2018												Remarks	Achievement	Non-Compliance
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
<b>Outlets</b>																																																															
1-1 Install flow meters to water treatment plants 1 and 2	Progress 100%																																																														
1-2 Measure monthly water production of water treatment plants 1, 2, 3, and 4	Progress 0%																																																														
1-3 Verify the above water production monthly	Progress 0%																																																														
1-4 Calculate the monthly water consumption based on the billing data	Progress 0%																																																														
1-5 Calculate monthly water production of each area of CTWB using the data obtained from Activity 1-3 and 1-4	Progress 0%																																																														
1-6 Install zone meters, water pressure monitoring (Inventory) system	Progress 0%																																																														
1-7 Measure and calculate for water production of each zone in water distribution area	Progress 0%																																																														
<b>Interoperational</b>																																																															
2-1 Review existing WTP operations in each pilot Area Office	Progress 100%																																																														
2-2 Contact capacity management of operation and the relevant staff	Progress 100%																																																														
2-3 Identify and select PMA Meeting Area (PMA) for each Pilot Area Office based on the selected PMA	Progress 100%																																																														
2-4 Review existing distribution network drawings for each PMA	Progress 100%																																																														
2-5 Install water treatment system PMA and monitor its performance	Progress 100%																																																														
2-6 Zone every PMA into Sub-Meeting Areas (SMA)	Progress 100%																																																														
2-7 Install ESMA by meeting area	Progress 100%																																																														
2-8 Update the distribution network drawings for each SMA	Progress 100%																																																														
2-9 Measure an initial level of NRW of each SMA	Progress 0%																																																														
2-10 Conduct NRW reduction program (initial NRW reduction and final connection of each SMA)	Progress 100%																																																														
2-11 Develop NRW reduction operation manual for each SMA in coordination target to newly installed	Progress 100%																																																														
2-12 Review and agree WTP reduction operation plan of each SMA	Progress 100%																																																														





## List of Equipment for the Project

No.	Equipment	Specification	Procurement in		Quantity		Hand-over	Remarks
			Japan	Nigeria	Plan	Actual		
<b>For Activity 1-2</b>								
1	Ultrasonic flow meter (stationary, 220m)	Ultrasonic pulse transmit time difference method, sensor for 600-1,500mm, 220m	✓		2	2	✓	including installation, commissioning and training
2	Ultrasonic flow meter (stationary, 300m)	Ultrasonic pulse transmit time difference method, sensor for 600-1,500mm, 300m	✓		2	2	✓	including installation, commissioning and training
3	Data logger (stationary)	Paperless, 6 points, 1s-1h record cycle, 4-20mA, trend, bar graph and historical trend	✓		1	1	✓	for the above No.1&2 ultrasonic flow meters
<b>For Activity 1-6</b>								
1	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 10m cable	✓		6	-	Not yet	including installation, commissioning and training
2	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 20m cable	✓		3	-	Not yet	including installation, commissioning and training
3	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 30m cable	✓		2	-	Not yet	including installation, commissioning and training
4	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 40m cable	✓		2	-	Not yet	including installation, commissioning and training
5	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 25-250mm, 10m cable	✓		1	-	Not yet	including installation, commissioning and training
6	Data logger (stationary)	Paperless, 6pts, 1s-1h record cycle, 4-20mA, trend, bar graph and historical trend	✓		13	-	Not yet	for the above No.1-5 ultrasonic flow meters
7	Data logger (portable)	2ch (flow and pressure), 1s - 24h record cycle, 4-20mA, 5 years battery life	✓		2	-	Not yet	
8	Remote Monitoring System	Telemetry with transmission, modem/router, container, interface, PC, printer, UPS,	✓		2	-	Not yet	Pilot system
9	Solar System	80VA, 1.0kW (not yet confirmed)		✓	2	-	Not yet	for the above ultrasonic flow meter
10	Solar System	80VA, 0.3kW (not yet confirmed)		✓	8	-	Not yet	for the above ultrasonic flow meter
11	Solar System	110VA, 0.4kW (not yet confirmed)		✓	1	-	Not yet	for the above ultrasonic flow meter
12	Solar System	110VA, 0.4kW (not yet confirmed)		✓	2	-	Not yet	for the above ultrasonic flow meter and telemetry system
<b>For Activity 2-4 and 2-8</b>								
1	GIS software	Intergraph Geomedia Essential		✓	1	1	✓	Software has been adopted by AGIS. V13.1
2	GIS software	ESRI ArcGIS Basic Version 10.3		✓	1	1	✓	Mainly for data input
3	Plotter (A0)	A0		✓	1	1	✓	
4	GPS terminal	High sensitivity, 2,000pts, 200routes, IPX7, built-in camera (5mega-pixel), USB, nickel hydride battery pack		✓	2	2	✓	Garmin
5	Personal computer	500HD, 4 GB Ram, Windows 7or8, Microsoft Office installed, Mouse		✓	2	2	✓	
6	Anti-virus software			✓	2	2	✓	for the above PCs (No.5)
7	UPS	1.2kVA		✓	2	2	✓	
<b>For Activity 2-5</b>								
1	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 450mm, 20m cable	✓		1	1	✓	
2	Data logger (portable)	2ch (flow and pressure), 1s - 24h record cycle, 4-20mA, 5 years battery life	✓		1	1	✓	for the above No.1 ultrasonic flow meter
3	Flow meter	Dia. 50mm with fittings		✓	-	-	-	
4	Flow meter	Dia. 80mm with fittings		✓	-	-	-	
5	Flow meter	Dia. 100mm with fittings		✓	-	-	-	
6	Flow meter	Dia. 150mm with fittings		✓	0	1	✓	
7	Flow meter	Dia. 200mm with fittings		✓	1	2	✓	
8	Flow meter	Dia. 250mm with fittings		✓	0	0	✓	
9	Flow meter	Dia. 300mm with fittings		✓	3	3	✓	
<b>For Activity 2-7</b>								
1	Sluice valve	Dia. 50mm with fittings		✓	2	0	-	
2	Sluice valve	Dia. 80mm with fittings		✓	0	0	-	
3	Sluice valve	Dia. 100mm with fittings		✓	9	1	✓	
4	Sluice valve	Dia. 150mm with fittings		✓	12	7	✓	
5	Sluice valve	Dia. 200mm with fittings		✓	6	8	✓	
6	Sluice valve	Dia. 250mm with fittings		✓	2	0	✓	
7	Sluice valve	Dia. 300mm with fittings		✓	10	6	✓	
<b>For Activity 2-10</b>								
1	Ultrasonic flow meter (portable)	Ultrasonic pulse transmit time difference method, sensors (small x3, medium x6,	✓		6	6	✓	
2	Data logger (portable)	2ch (flow and pressure), 1s - 24h record cycle, 4-20mA, 5 years battery life	✓		6	6	✓	
3	Leak noise correlator	Main unit, preamplifier and piezoelectric sensor	✓		2	2	✓	
4	Water leak detector	Acoustic type, piezoelectric sensor	✓		6	6	✓	
5	Non-metal pipe locator	Electromagnetic induction type for plastic pipe (PVC, PE)	✓		3	3	✓	
6	Metal locator	Optical and acoustical output signal, 50cm depth	✓		3	3	✓	
7	Time integral water leak detector	Automatic leak noise determination method	✓		3	3	✓	
8	Acoustic rod	1.5m length	✓		9	9	✓	
9	Distance meter	Max. 10km, 10cm scale	✓		3	3	✓	
10	Hammer drill	Dia. 38mm, 270rpm, 3,000 stroke/min	✓		3	3	✓	
11	Boring bar	Dia. 16mm, 1.0m length	✓		3	3	✓	
12	Drill bit	Dia. 19x800mm	✓		9	9	✓	
13	Portable residual chlorine analyzer	DPD, absorptiometry, 0.02-2.00mg/L	✓		3	3	✓	
14	Metal pipe and cable locator	5m depth	✓		3	3	✓	
15	Reference meter	Portable built-in case type, 13-25mm	✓		3	3	✓	
16	Leakage quantity measurement device	13-25mm	✓		3	3	✓	
17	Personal computer	500HD, 2GB Ram, Windows 7or8, Microsoft Office installed, Mouse		✓	3	3	✓	
18	Anti-virus software			✓	3	3	✓	for the above PCs (No.17)
19	UPS	1.2kVA		✓	3	3	✓	
20	Inkjet printer	A4, Color, All-in-one		✓	3	3	✓	
21	Digital camera	Compact type, Optical zoom, 10 mega-pixel (min), LCD		✓	3	3	✓	
<b>For Activity 2-13</b>								
1	Generator	200V, 6.5kVA		✓	3	3	✓	
2	Asphalt cutter	3600RPM, 13kW		✓	3	3	✓	
3	Concrete breaker			✓	3	3	✓	
4	Small-sized dewatering pump	2"		✓	3	3	✓	
5	Small-sized tamper			✓	3	3	✓	
6	Electric drum	50m		✓	3	3	✓	
7	Customer meter	Dia. 2/3" with fittings, conventional type		✓	388	0	-	
8	Customer meter	Dia. 1" with fittings, conventional type		✓	259	600	✓	
9	Customer meter	Dia. 50mm with fittings, conventional type		✓	89	0	-	
10	Customer meter	Dia. 80mm with fittings, conventional type		✓	23	0	-	
11	Customer meter	Dia. 100mm with fittings, conventional type		✓	7	0	-	
12	Compact Reciprocating Saw	Pipe cutting		✓	3	3	✓	
<b>For Output 2</b>								
1	Pickup truck for pilot sites			✓	2	2	✓	
<b>For Operation of the Project</b>								
1	Laser printer	A4, B/W		✓	1	1	✓	
2	Inkjet printer	A3, Color		✓	1	1	✓	
3	Multifunction copier	A3, B/W		✓	1	1	✓	
4	Graphic/movie editing software	Windows Movie Maker, Microsoft Powerpoint		✓	1	1	✓	Free or preinstalled softwares to be utilized.
5	Projector	3,000 Lummen, HDMI, VGA, USB port		✓	1	1	✓	



Annex 2: Participants in Preparation of Project Monitoring Sheets and Photos

**Participants in Preparation of Draft Project Monitoring Sheet**

**Day: 19<sup>th</sup> September 2016**

S/N	NAME	POSITION
1	S.T. Bello	HOD Admin&Supply (Deputy Project Manager)
2	Nahuche A.A	HOD Distribution (Technical Manager)
3	Adis Muhammed S.	HOD Commerce (Technical Manager)
4	Lawal Abolade R.	Head [Special Projects] (Coordinator)
5	Dikko Musa	Head[PL&Wc]
6	Rabiu M.Kabir	Head [Logistics]
7	Suleiman Shehu	Head [GIS]
8	Akinori Miyoshi	CA, JICA Expert Team
9	Takashi Mori	JICA Expert Team

**Photos of Preparation of Draft Project Monitoring Sheet**

	<p>Preparation of Project Monitoring Sheets (Attendance: NRW Management Team members)</p>
	<p>Preparation of Project Monitoring Sheets (Attendance: NRW Management Team members)</p>





To Chief Representative of JICA Nigeria Office

## PROJECT MONITORING SHEETS

**Project Title: The Federal Capital Territory Reduction of Non-Revenue Water**

**Project**

**Version of the Sheet: Ver. 5(Term covered: January, 2017 - July, 2017)**

**Name: Akinori Miyoshi**

**Title: Chief Advisor**

**Submission Date: 24 August 2017**

### I. Summary

#### 1 Progress

##### 1-1 Progress of Inputs

###### **[The Nigerian Side]**

###### Project Personnel

All project members including Project Director, Project Manager, Deputy Project Manager, Technical Managers, Non-Revenue Water (NRW) Management Team members, NRW Action Team members have been involved in the Project.

###### Land, Building and Facilities

Office spaces and necessary facilities at the Federal Capital Territory Water Board (FCTWB) have been provided for the Japanese side.

###### Local Costs

Cost for operation and maintenance of the provided equipment, and also administrative and operational costs for local traveling, demurrage and communication of telemetric device have been provided. However, these costs have been paid temporarily by the Japanese side because of delay in release of the Counterpart Fund, which will be refunded.

###### **[The Japanese Side]**

###### JICA Experts

Japan International Cooperation Agency (JICA) Expert Team consisting of a Chief Advisor and members for nine areas of expertise were assigned to the works in Nigeria for 17.1 man-months between January 2017 and July 2017 (83.6 man-months from the commencement of the Project in November 2014).

###### Equipment

Equipment for water distribution management such as zonal meters, data loggers, telemetric

monitoring system and etc. were procured in Japan, delivered and handed over to FCTWB.

Equipment for solar powering systems for zonal meters, data loggers and telemetric monitoring system were procured in Nigeria, delivered and handed over to FCTWB.

Installation of zonal meters, data loggers, telemetric monitoring system and solar powering systems is ongoing from July to August 2017.

Materials for follow-up activities of pilot projects such as pipe, fittings, valves and etc. were procured.

Refer to the Annex-1: List of Equipment for the Project.

#### Facilities

There are no inputs during this monitoring period.

#### Training of the Nigerian Project Personnel

The third training in Japan for six delegation officials from both Federal Capital Development Authority (FCDA) and FCTWB was conducted in the period between 10<sup>th</sup> and 14<sup>th</sup> July 2017. Refer to the Annex-2: The Third Training in Japan.

## 1-2 Progress of Activities

[Activities for Output-1: Level of NRW of both the service area of FCWTB and water distribution areas monitored regularly.]

No	Activity	Previous Monitoring (as at Dec.2016) *Progress against Phase-1 Work Plan	Current Monitoring (as at Jul.2017) *Progress against Phase-2 Work Plan
1-1	Install bulk meters to water treatment plants 1 and 2	Completed. However, data acquisition seems to be not always available, which may be due to not water-filled flow inside pipelines.	Completed.
1-2	Measure monthly water production of water treatment plants 1, 2, 3, and 4	Progress: 0%, Behind: 9.5 months Ready to measure monthly water production but the Project needs at least 6 months for monitoring this Activity.	Progress: 0%, Behind: 7.0 months Flow data measurement has not always been available, which is due to non-full of water flow inside pipelines and electrical challenges (fuse burning). The Project needs at least 6 months for monitoring this Activity.
1-3	Tally the above water production data monthly	Progress: 0%, Behind: 9.5 months Ready to measure monthly water production but the Project needs at least 6 months for monitoring this Activity.	Progress: 0%, Behind: 7.0 months The Project needs at least 6 months for monitoring this Activity.
1-4	Calculate the monthly water consumption based on the billing data	Completed (billing system modification only). Ready to calculate monthly water consumption, but the Project needs at least 6 months for monitoring this Activity.	Behind: 7.0 months (Calculation pending) Zonal coding is ongoing for water distribution management. The Project needs at least 6 months for monitoring this Activity. Re-evaluation and update of the modified billing system is necessary. Constant power supply, adequate provision for consumables and SOP are necessary.
1-5	Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4	Progress: 0%, Behind: 4.5 months Ready to calculate monthly NRW ratio, but the Project needs at least 6 months for monitoring this Activity.	Progress: 0%, Behind: 7.0 months The Project needs at least 6 months for monitoring this Activity.
1-6	Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system	Progress :90%, Behind: 4.5 months Delayed. Construction of chambers for zonal meters was completed Zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system have been procured in Japan.	Progress :95%, Behind: 0.0 months Setting-up of zonal meters has not been done properly due to non-full of water flow inside pipelines (Automatic Gain Adjustment for data correction). Constant power supply and adequate provision for logistics are necessary.
1-7	Measure and collect data for water distribution management such as water flow of zonal meters and water pressure	Progress: 0%, Behind: 4.5 months Delayed as a result of delay in Activity 1-6. The Activity will be implemented after the completion of Activity 1-6.	Progress: 0%, Behind: 0.0 months The Activity will be implemented after the completion of Activity 1-6.

**[Activities for Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

No	Activity	Previous Monitoring (as at Dec.2016) *Progress against Phase-1 Work Plan	Current Monitoring (as at Jul.2017) *Progress against Phase-2 Work Plan
2-1	Review existing NRW reduction operations at each pilot Area Office	Completed.	Completed.
2-2	Conduct capacity assessment of organization and the relevant staff	Progress: 50%, Behind: 0.0 months Done for Phase-1.	Progress: 50%, Behind: 2.0 months Assessment will be done after the completion of follow-up activities in Garki I and also NRW monitoring in pilot Area offices.
2-3	Identify and select a Pilot Metering Area (PMA) for each Pilot Area Office based on the selection criteria of PMA	Completed.	Completed.
2-4	Prepare/update distribution network drawings for each PMA	Completed. AGIS security has still hindered data import/export and analysis in spite of FCTA PS's instruction.	Completed. Refer to Activity 3-3.
2-5	Install water flow meters to each PMA and measure in/outflows monthly	Completed, but partially and provisionally. Check/repair a PMA meter in Jabi and complete fully electricity connection for the ultrasonic flow meter in Garki I	Completion (installation only). Meter reading in Gudu is ongoing. Adequate provision for logistics and SOP are necessary for monitoring monthly in/outflows.
2-6	Zone each PMA into Sub Metering Areas (SMA)	Completed.	Completed.
2-7	Isolate a SMA by installing valves	Completed.	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but provisionally completed in Garki I because of unsuccessful NRW reduction. Discrepancy between as-built drawings and actual situation on ground exist, and updated as-built drawings are not available. Information management with standardization and quality should be improved.
2-8	Update the distribution network drawings for each SMA	Completed.	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but provisionally completed in Garki I because of unsuccessful NRW reduction. Refer to Activity 3-3.
2-9	Measure an initial level of NRW of each SMA	Completed.	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area

No	Activity	Previous Monitoring (as at Dec.2016) *Progress against Phase-1 Work Plan	Current Monitoring (as at Jul.2017) *Progress against Phase-2 Work Plan
			Offices, but provisionally completed in Garki I because of unsuccessful NRW reduction. Activity in Garki I will be repeated. Administrative complication with respect to Commerce operations (mixture of customer categories, meter types, reading divisions, water tariff, etc.) has suffered the Activity. Streamlining, simplification, uniform management are necessary.
2-10	Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA	Provisionally completed. Re-detection may be done if necessary.	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but provisionally completed in Garki I because of unsuccessful NRW reduction. Activity in Garki I will be repeated and will be kept in pilot Area offices based on results of Activity 2-5.
2-11	Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of Distribution Department	Provisionally completed. Revision may be done if necessary.	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but provisionally completed in Garki I because of unsuccessful NRW reduction. Revision will be done in Garki I.
2-12	Review and approve NRW reduction operation plan of each SMA	Provisionally completed. Revision may be done if necessary.	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but not completed in Garki I because of unsuccessful NRW reduction. Revision will be done in Garki I.
2-13	Implement NRW reduction operations at each SMA	Provisionally completed. Further operations may be done if necessary.	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but not completed in Garki I because of unsuccessful NRW reduction. Further operations will be done in Garki I.
2-14	Monitor the progress of the NRW reduction operations of each SMA	Provisionally completed. Further monitoring may be done if necessary.	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but not completed in Garki I because of unsuccessful NRW reduction. Further operations will be done in Garki I.
2-15	Measure level of NRW of each SMA at the end of the respective operations	Provisionally completed. Detailed check and revision may be done if necessary.	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but not completed in Garki I because of unsuccessful NRW

No	Activity	Previous Monitoring (as at Dec.2016) *Progress against Phase-1 Work Plan	Current Monitoring (as at Jul.2017) *Progress against Phase-2 Work Plan
			reduction. Further operations will be done in Garki I.
2-16	Prepare a report on pilot projects, covering Activity 2-1~2-15	Provisionally completed. Detailed check may be done if necessary.	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but not completed in Garki I because of unsuccessful NRW reduction. Revision will be done after the completion of Activity 2-10 to 2-15.
2-17	Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers & meter readers), incl. audio visual materials	Provisionally completed. Revision may be done if necessary.	Progress: 50%, Behind: 0.0 months (Follow-up) Revision ongoing. Finalization will be done after the completion of Activity 2-10 to 2-16.

**[Activities for Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

No	Activity	Previous Monitoring (as at Dec.2016)	Current Monitoring (as at Jul.2017)
3-1	Establish a Working Group for NRW reduction planning	Completed, but will be reviewed in Phase-2.	Reviewed and completed.
3-2	Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB	Completed, but will be reviewed in Phase-2.	Reviewed and Completed. Lack of HRD planning of FCTWB's staff. FCTWB should have comprehensive training programme including OJT and internal training.
3-3	Conduct hydraulic and water pressure distribution analyses of the pipeline networks	To be implemented in Phase-2. AGIS security has still hindered data import/export and analysis in spite of FCTA PS's instruction.	Progress: 00%, Behind: 2.0 months To be completed by November 2017. Close communication and feed-back with FCDA should be enhanced. Pipeline and customer information should be entered extensively into GIS for all service areas.
3-4	Develop outlines of the medium-term strategic plan and its annual NRW reduction plan (approval by the Director)	To be implemented in Phase-2.	Progress: 25%, Behind: 0.0 months Draft content was prepared and officers were selected provisionally. Scenarios of NRW reduction strategic plan has been discussed. To be completed by November 2017.
3-5	Develop the first medium-term strategic plan (2018-2022) for approval by FCTA	To be implemented in Phase-2.	Progress: 00%, Behind: 0.0 months To be completed by March 2018.
3-6	Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA	To be implemented in Phase-2.	Progress: 00%, Behind: 0.0 months To be completed by March 2018.
3-7	Develop a planning manual for NRW reduction	To be implemented in Phase-2.	Progress: 00%, Behind: 0.0 months To be completed by March 2018.
3-8	Review existing plans, activities and implementing structure, etc. related to water distribution management	Progress: 75%, Behind: 11.0 months Delayed as a result of delay in information submission from Area Offices. 8 out of 13 Area Offices submitted the required information. There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances.	Progress: 80%, Behind: 0.0 months Some Area Offices submitted the required information. To be completed by October 2017. Close communication and feed-back among FCTWB's divisions should be enhanced. Pipeline and customer information should be entered extensively into GIS for all service areas.
3-9	Establish framework of water distribution management	Progress: 25%, Behind: 4.5 months Delayed as a result of delay in Activity 1-6 and 1-7.	Progress: 25%, Behind: 0.0 months To be completed by October 2017.

### 1-3 Achievement of Output

**[Output-1: Level of NRW of the service area of FCTWB is monitored regularly.]**

No	Indicator	Previous Monitoring (as at Dec.2016)	Current Monitoring (as at Jul.2017)
1a	Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first (*replace by "second" in PDM2) year of the Project.	No achievement (delayed). Monthly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-2 to 1-4. In the current schedule, it is expected that monthly NRW ratio will be obtained from the second quarter of the third year.	None and delayed as a result of delay in Activities 1-2 to 1-5.
1b	Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the first (*replace by "second" in PDM2) year of the Project.	No achievement (delayed). Same as the above in Indicator 1a.	None and delayed as a result of delay in Activities 1-2 to 1-5.
1c	Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors (*replace by "Management" in PDM2) of FCTWB from the third quarter of the first (*replace by "second" in PDM2) year of the Project.	No achievement (delayed). Quarterly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-2 to 1-4. In the current schedule, it is expected that quarterly NRW ratio will be obtained from Mar. 2017, the second quarter of the third year.	None and delayed as a result of delay in Activities 1-2 to 1-5.
1d	Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department from the first quarter of the third year of the Project.	No achievement (as planned).	None and delayed as a result of delay in Activities 1-6 and 1-7.

**Verification of Achievement and Implementing Process**

Although the Project found out the failure of main units of bulk flow meters in the beginning of March 2017, FCTWB purchased spare parts from Japan and repaired them with support of JICA Expert Team for data acquisition to achieve Output-1. Also, based on preliminary investigation by FCTWB and JICA Expert Team, FCTWB has communicated with FCDA to discuss solutions to non-full water flow inside pipelines and interference along trunk mains by water flow from new water treatment plant (No.3&4) to water flow from old plant (No.1&2) at the upstream point of bulk flow meters.

To avoid further delay, FCTWB has accomplished tax exemption for import of zonal meters, telemetric system and etc. procured from Japan.

There are no problems in the implementing process during this monitoring period.



**[Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

No	Indicator	Previous Monitoring (as at Dec.2016)	Current Monitoring (as at Jul.2017)																																																																																																														
2a	Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations.	<p>Most of results did not reach the target level.</p> <p>Provisional NRW Ratio (%)</p> <table border="1"> <thead> <tr> <th></th> <th>Before</th> <th>After</th> <th>Red. Point</th> </tr> </thead> <tbody> <tr> <td colspan="4"><b>Gudu</b></td> </tr> <tr> <td>SMA-1</td> <td>52.0</td> <td>62.9</td> <td>-10.9</td> </tr> <tr> <td>SMA-2</td> <td>53.9</td> <td>49.0</td> <td>4.9</td> </tr> <tr> <td colspan="4"><b>Jabi</b></td> </tr> <tr> <td>SMA-2</td> <td>47.6</td> <td>48.0</td> <td>-0.4</td> </tr> <tr> <td>SMA-3</td> <td>86.4</td> <td>67.2</td> <td>19.2</td> </tr> <tr> <td colspan="4"><b>Garki I</b></td> </tr> <tr> <td>SMA-1</td> <td>86.6</td> <td>82.9</td> <td>3.7</td> </tr> <tr> <td>SMA-2</td> <td>79.0</td> <td>85.0</td> <td>-6.0</td> </tr> <tr> <td>SMA-3</td> <td>68.8</td> <td>41.8</td> <td>27.0</td> </tr> </tbody> </table> <p>Detailed re-check of results and follow up activities to achieve the target level are immediately necessary by utilizing lessons and learnt.</p>		Before	After	Red. Point	<b>Gudu</b>				SMA-1	52.0	62.9	-10.9	SMA-2	53.9	49.0	4.9	<b>Jabi</b>				SMA-2	47.6	48.0	-0.4	SMA-3	86.4	67.2	19.2	<b>Garki I</b>				SMA-1	86.6	82.9	3.7	SMA-2	79.0	85.0	-6.0	SMA-3	68.8	41.8	27.0	<p>Achieved in Gudu and Jabi pilot Area Offices, but not achieved in Garki I.</p> <p>NRW Ratio (%)</p> <table border="1"> <thead> <tr> <th></th> <th>Bef</th> <th>Aft</th> <th>Red. Point</th> <th>Target After Full (80%)</th> <th></th> </tr> </thead> <tbody> <tr> <td colspan="6"><b>Gudu</b></td> </tr> <tr> <td>SMA-1</td> <td>52.0</td> <td>14.3</td> <td>37.7</td> <td>26.0(31.2)</td> <td>OK</td> </tr> <tr> <td>SMA-2</td> <td>53.9</td> <td>28.7</td> <td>25.2</td> <td>27.0(32.3)</td> <td>OK</td> </tr> <tr> <td colspan="6"><b>Jabi</b></td> </tr> <tr> <td>SMA-2</td> <td>45.6</td> <td>21.1</td> <td>24.5</td> <td>22.8(27.4)</td> <td>OK</td> </tr> <tr> <td>SMA-3</td> <td>87.6</td> <td>42.6</td> <td>45.0</td> <td>43.8(52.6)</td> <td>OK</td> </tr> <tr> <td colspan="6"><b>Garki I</b></td> </tr> <tr> <td>SMA-1</td> <td>85.1</td> <td>62.2</td> <td>22.9</td> <td>42.6(51.1)</td> <td>No</td> </tr> <tr> <td>SMA-2</td> <td>74.8</td> <td>78.2</td> <td>-3.4</td> <td>37.4(44.9)</td> <td>No</td> </tr> <tr> <td>SMA-3</td> <td>70.0</td> <td>53.7</td> <td>16.3</td> <td>35.0(42.0)</td> <td>No</td> </tr> </tbody> </table>		Bef	Aft	Red. Point	Target After Full (80%)		<b>Gudu</b>						SMA-1	52.0	14.3	37.7	26.0(31.2)	OK	SMA-2	53.9	28.7	25.2	27.0(32.3)	OK	<b>Jabi</b>						SMA-2	45.6	21.1	24.5	22.8(27.4)	OK	SMA-3	87.6	42.6	45.0	43.8(52.6)	OK	<b>Garki I</b>						SMA-1	85.1	62.2	22.9	42.6(51.1)	No	SMA-2	74.8	78.2	-3.4	37.4(44.9)	No	SMA-3	70.0	53.7	16.3	35.0(42.0)	No
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2b	Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project.	<p>Technical manuals were prepared and provisionally approved.</p> <p>Revision may be necessary.</p>	<p>Technical manuals were prepared and provisionally approved, but reviewed and updated in Phase-2.</p>																																																																																																														
<p><b>Verification of Achievement and Implementing Process</b></p> <p>Under the circumstances that the Counterpart Fund 2017 has not been available as a result of non-passage of 2017 appropriation, the Project made efforts of implementation of pilot projects as follow-up activities to achieve the target in March and April 2017 with concentrated inputs including supervisors and supporters from the FCTWB Headquarters and other Area Offices.</p> <p>The activities related to pilot projects have been suspended from July 2017, but as soon as installation of zonal meters and solar powering systems is completed, the Project resumes the activities.</p> <p>There are no problems in the implementing process during this monitoring period.</p>																																																																																																																	

**[Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

No	Indicator	Previous Monitoring (as at Dec.2016)	Current Monitoring (as at Jul.2017)
3a	By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval.	No achievement (as planned).	None (as planned).
3b	By October 2017, an annual NRW reduction plan (2018) is incorporated in FCWTB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval.	No achievement (as planned).	None (as planned).
3c	A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project.	No achievement (as planned).	None (as planned).
3d	By November 2016, framework of water distribution management is established.	No achievement (delayed). Framework has not been ready due to delay in Activity 1-6 and 1-7.	None and delayed. Framework has not been ready due to delay in Activity 1-6, 1-7, 3-8 and 3-9.

**Verification of Achievement and Implementing Process**

The activities related to medium-term strategic plan for NRW reduction have been suspended from July 2017, but as soon as installation of zonal meters and solar powering systems is completed, the Project resumes the activities. There are no problems in the implementing process during this monitoring period.

## 1-4 Achievement of the Project Purpose

[Project Purpose: Capacity of FCTWB for NRW reduction is strengthened.]

No	Indicator	Previous Monitoring (as at Dec.2016)	Current Monitoring (as at Jul.2017)
a	The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.	No achievement (as planned).	None (as planned).
b	NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB.	No achievement (as planned).	None (as planned).
c	Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level.	Ongoing. Results of interim capacity assessment in Nov.-Dec. 2016 show that capacity developed has not reached to the criteria. Follow-up capacity development is necessary in Phase-2 of the Project.	Follow-up capacity development have been done in Phase-2 of the Project.
d	NRW ratio of each PMA in the last quarter of the Project reaches its respective target (**). Note(**):Target for each PMA is expected to be determined by the end of the first quarter of the second year.	No achievement (as planned).	None (as planned). Inflow data has been read in Gudu, but not in Jabi and Garki I.
<p><b>Verification of Achievement and Implementing Process</b></p> <p>Budget constraint from the Nigerian side has slowed down the achievement of project purpose, particularly Indicator b.</p> <p>There are no problems in the implementing process during this monitoring period.</p>			

## 1-5 Changes of Risks and Actions for Mitigation

Following last physical year 2016, recent budget constraint of the Nigerian side including non-release or late-release of the Counterpart Fund has corresponded to an important assumption "A. Natural disaster / political instability / economic crisis that affect the Project activities do not occur." in 2017, too. As an action discussed in the past project monitoring, taking over procurement of small materials for Pilot activities by the Japanese side, subsequent to the request from the Nigerian side, has mitigated this risk.

## 1-6 Progress of Actions undertaken by JICA

The JICA Expert Team procured small materials for the follow-up Pilot activities.

## **1-7 Progress of Actions undertaken by Nigerian side**

FCTWB cooperated with the JICA Expert Team for smooth procurement of small materials for the follow-up Pilot activities. FCTWB has requested FCTA for the immediate release of the Counterpart Fund.

## **1-8 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)**

### **(1) Personnel Reassignment of the FCTWB's Project Members**

In June 2017, the Director of FCTWB, Technical Managers (Heads of Distribution and Commerce) and other Project members including Pilot Area Managers were relocated.

FCTWB needs to assure transfer of information, knowledge and lessons learned in the Project activities to his/her successor and other members.

### **(2) Delay in Release of Counterpart Fund 2017**

Though national budget for 2017 was approved in June 2017, but FCT budget for 2017 is still in the process of the approval. Accordingly, the Counterpart Fund 2017 has not been released yet. The Nigerian side needs to keep in touch with JICA Expert Team on the status of FCT budget approval and release of the Counterpart Fund.

### **(3) Legal Instrument (Enabling Law) establishing autonomous FCTWB**

Through deliberations of bills by the sub-committee for FCT, the FCTWB Bill was presented at public hearing and then passed to the National Assembly for approval. Hereafter, remaining steps are approvals by the National Assembly and then the President.

In anticipation of autonomy in the near future, JICA Expert Team suggests FCTWB set up a preparatory committee or task-force to discuss solutions to various issues and challenges surrounding FCTWB as well as strengthening and improvement in management.

### **(4) Administrative Complication with respect to Commerce Operations**

Mixture of customer categories, meter types, reading divisions and water tariff, etc. have caused inefficiency in commerce operations which leads to financial losses of FCTWB. JICA Expert Team suggests FCTWB to resolve the issues in consideration of streamlining, simplification and uniform management among relevant Units.

### **(5) Project Vehicle**

Investigation of conditions of the project vehicle damaged by the traffic accident in March 2017 and arrangement of an alternate vehicle for implementing project activities are necessary.

FCTWB will send staff in charge to the Federal Road Safety Corps in Lokoja for the investigation, and also will bring back then repair the vehicle if possible, or purchase a new vehicle by using

Counterpart Fund if the conditions are critical.

## **(6) Situation of Actions raised in the past Monitoring**

### **(6)-1: Action for “Involvement of Counterparts”**

One FCTWB staff belonging to Gudu Area Office has a high motivation to implement the NRW reduction activities by his effort outside the Pilot Metering Area based on action plan which was prepared by him in the training course in Hokkaido, Japan.

From the beginning, the Project aims to promote such NRW reduction activities outside the Pilot Metering Area by the Nigerian self-effort, this is good example of the Project activities.

Situation: He has identified a candidate project site, materials to be procured for the implementation of the action plan and prepared estimated cost. However, the budget for funding has not been approved.

### **(6)-2: Action for “Assignment of Counterparts”**

Considering sustainability of implementing NRW reduction based on a NRW reduction strategic plan to be prepared through Output 3 activities, it may be necessary for the Nigerian side to enhance project management skill for working level staff such as Head of Unit for example. Such project management skill should be enhanced through the Project activities. In addition, the existing operational structure should be reviewed.

Situation: Remarkably, FCTWB created new unit “NRW Unit” consisting of a Unit Head and two staff in Distribution Department in March 2017, which deals with all NRW aspects. Since this establishment, NRW Unit has been always a center point in project implementation and project management skill is being developed through the Project.

### **(6)-3: Action for “Involvement of Relevant Organizations”**

FCTA has been involved well in the Project as the chairperson of Joint Coordination Committee (JCC) and also has assisted and advised the Project in dealing with issues including the Counterpart Fund and AGIS security.

Situation: Due to non-responsive action by AGIS and then no relaxation in AGIS security, FCTWB decided to establish its own GIS which is separated from AGIS security.

### **(6)-4: Action for “Communication between Distribution Department and Commerce Department”**

The JICA Expert Team reported that Distribution Department and Commerce Department have to implement the cross-cutting activities for NRW reduction. Both Departments understand the importance of collaboration and active communication; however they need to collaborate more to the success of the Project. Also, active participation of Commerce staff (FCTWB Headquarters) particularly in the field activities is a key to success of the Project and improvement in water supply services.

Situation: The newly-created “NRW Unit” is expected to work in conjunction with all

stakeholders.

**(6)-5: Action for “Necessity for Strengthening Partnership between FCDA and FCTWB”**

It is necessary for FCTWB to obtain the updated as-built drawings and information correctly and timely for proper operation, maintenance and implementing NRW reduction activities efficiently. However, FCWB has not been able to obtain the updated as-built drawings and information in respect of its operation and maintenance activities from FCDA charged with responsibility of providing infrastructure. This is as a result of lack of feedback system between the two sister agencies. So, FCTWB is encouraged to always share its operation and maintenance experiences with FCDA while FCDA is equally advised to carry along FCTWB in its water project implementation.

Situation: The Project has communicated officially/bilaterally with FCDA for setting up further relationship and information sharing. Remarkably, through occasion of participating in the third training in Japan by delegation officials comprised of FCDA and FCTWB, their partnership has been more strengthened through shared awareness and knowledges.

**(6)-6: Action for “Lack of the Quality Management”**

The monitoring survey mission found quality of information and performance as well as quality of constructed facilities is not properly managed by FCTWB. For example,

- (a) Information such as deliverables from FCTWB has lacked often accuracy, so this has led to decrease in data reliability and duplication of effort.
- (b) There are many honeycombs on the surface of the concrete of constructed chambers for the bulk flowmeter.
- (c) In Garki I Pilot area, FCTWB cannot read PMA flowmeter regularly because of mortar plastering on entire concrete slab covers.
- (d) In Gudu Pilot area, inside of the chamber for PMA flowmeter is in muddy conditions because FCTWB has not placed concrete slab covers.

It is very important to pay attention to quality management in order to enhance the Project outcome with adequate performance, avoid further delay of the Project and keep sustainability through proper operation and maintenance.

Situation: Quality management of FCTWB has been improved through joint supervision of construction of bulk/zonal meter chambers and solar power system installation, etc.

**2 Delay of Work Schedule and/or Problems (if any)**

**2-1 Detail**

**(1) Delay of the Project (Output-1)**

Same as the previous monitoring, the Project has been delayed for six (6) months from the original plan of operation, and also Project needs certain time frame to monitor the water

production, consumption and NRW ratio. Without the monitoring, the Project cannot make a realistic NRW reduction strategic plan through the activities of Output 3, so that it is indispensable for securing the Project's outcome.

Available monitoring period of Activities 1-2 to 1-5 is insufficient, so the Project needs at least six months for monitoring the Activities 1-2 to 1-5.

### (2) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)

Through commissioning and/or periodical monitoring of bulk and zonal flow meters (ultrasonic meters), the Project found out that data acquisition is not always available due to non-full of water flow inside pipelines and also electrical challenges at bulk flow meters. Thus, the Project needs to solve this problem technically as soon as possible which leads to non-achievement of Activity 1-2 to 1-7.

### (3) Irregular Billing (Output-1)

Billing has not been regularly done due to non-constant power supply and other operational challenges, however the situation has begun to improve. June bills were produced while July bills is in process.

### (4) Unsuccessful Results of the Pilot Project (Output-2)

A series of follow-up activities and operations for NRW reduction in PMAs/SMA were completed in April 2017, however should be repeated and monitored particularly in Garki I, because the targeted reduction in NRW ratio was not achieved. See the following table.

**Table Reduction in NRW Ratio (Follow-Up)**

PMA/SMA	Before (%)	After (%)	Reduction Point	Target Ratio After (%) Full (80% case)	Acceptance
<b>Gudu</b>					
SMA-1	52.0	14.3	37.7	26.0 (31.2)	OK
SMA-2	53.9	28.7	25.2	27.0 (32.3)	OK
<b>Jabi</b>					
SMA-2	45.6	21.1	24.5	22.8 (27.4)	OK
SMA-3	87.6	42.6	45.0	43.8 (52.6)	OK
<b>Garki I</b>					
SMA-1	85.1	62.2	22.9	42.6 (51.1)	Not
SMA-2	74.8	78.2	+3.4	37.4 (44.9)	Not
SMA-3	70.0	53.7	16.3	35.0 (42.0)	Not

## 2-2 Cause

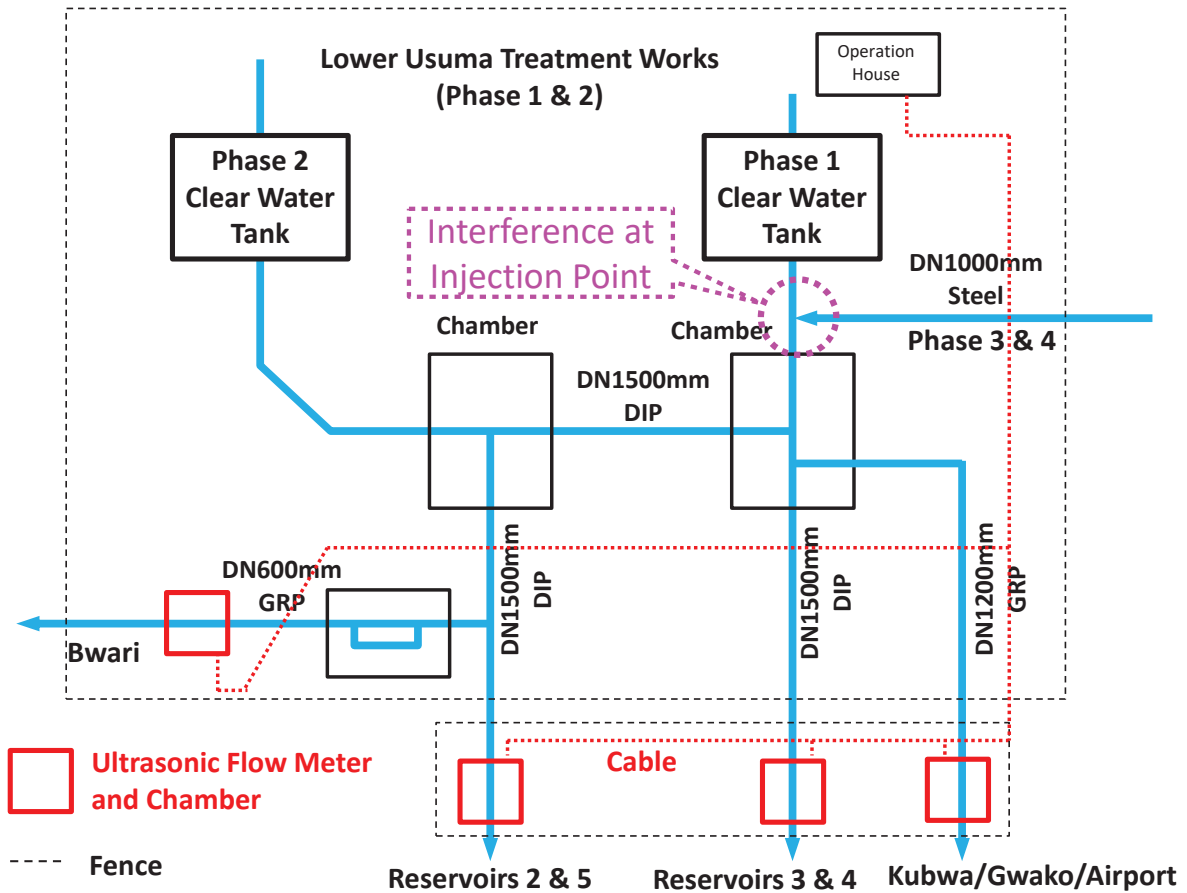
### (1) Delay of the Project (Output-1)

In the Phase-1, the chamber construction for bulk flow meters and procurement of necessary materials for pilot activities had delayed and suspended activities due to non-release of the

Counterpart Fund in 2015 and 2016. These were solved by JICA's intervention, particularly taking over chamber construction based on request from the Nigerian side. However, Activities 1-2 to 1-5 are still behind the schedule.

**(2) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)**

One of possible causes seems to be interference along trunk mains by water flow from new water treatment plants (No.3&4) to water flow from old plants (No.1&2) at the upstream point of bulk flow meters. However essentially, the Project identifies main cause as the situation that water supply (production) does not meet water demand in the whole system of FCTWB.



**(3) Irregular Billing (Output-1)**

The inability of regular billing is attributed to non-constant power supply. Also, non-fully optimized billing application has caused disorder of billing operations.

**(4) Unsuccessful Results of the Pilot Project (Output-2)**

As a change of conditions, new inlet pipeline into a SMA was discovered at the last minute during the follow-up activities in Garki I, which brought confusion to the implementation and analysis. In consideration of characteristics of Garki I pilot area, the Project assumes that



missing major consumers in the list and undiscovered inlet/outlet or connections caused unexpected results of the pilot project.

## **2-3 Action to be taken**

### **(1) Delay of the Project (Output-1)**

In the past monitoring, the Nigerian side requested to the Japanese side to extend the project period in order to secure the necessary time frame to monitor the water production, consumption and NRW ratio, then the Japanese side agreed it through approval of the past monitoring sheets by the JICA headquarters. So, the Project period will be extended for six months for monitoring the Activities 1-2 to 1-5.

### **(2) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)**

The Project continues to monitor water flow.

As proposed by the Nigerian side, the Project identifies how to estimate water supply (production) based on available and reliable data which the Project can obtain with support of JICA Expert Team. And, FCTWB solves electrical challenges of bulk meters immediately after detecting the cause.

### **(3) Irregular Billing (Output-1)**

Improvement in power supply conditions for resumption of regular billing has been addressed in FCTWB since June 2017.

The updated billing system and its operation are re-evaluated holistically and FCTWB reviews and prepares SOP for billing operations with support of JICA Expert Team.

### **(4) Unsuccessful Results of the Pilot Project (Output-2)**

As further follow-up activities, the Project repeats NRW reduction operations with focusing on major consumers in Garki I pilot area. Even if the operations lead to unsuccessful results again, FCTWB identifies factors responsible and analyzes cost-benefit.

## **2-4 Roles of Responsible Persons/Organization**

### **[Nigerian Side]**

#### **(1) Delay of the Project (Output-1)**

The Nigerian side signed the amendment of Record of Discussion (R/D) to extend the Project period in the end of December 2016, so will proceed to revision of PDM (PDM<sub>3</sub> to PDM<sub>4</sub>) for this extension.

#### **(2) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)**

FCTWB gathers all necessary data for the estimation of water supply (production) and distribution with the support of JICA Expert Team (effective measured data, proportional ratio among trunk and/or distribution mains, operation hours and any other useful data).

### **(3) Irregular Billing (Output-1)**

FCTWB keeps constant power supply improving for continuous billing operations with necessary provisions.

Also, FCTWB coordinates the system integrator and relevant Units such as MIS, billing and AMR to re-evaluate the numerous challenges of billing system operations and then solves them by reviewing and preparing SOP.

### **(4) Unsuccessful Results of the Pilot Project (Output-2)**

FCTWB repeats Activity 2-10 to 2-15 to reduce NRW to a certain degree as further follow-up activities with concentrated inputs including manpower, immediately after the completion of ongoing Activity 1-6.

## **[Japanese Side]**

### **(1) Delay of the Project (Output-1)**

The Japanese side signed the amendment of Record of Discussion (R/D) to extend the Project period in the end of December 2016, so will proceed to revision of PDM (PDM<sub>3</sub> to PDM<sub>4</sub>) for this extension.

### **(2) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)**

JICA Expert Team supports FCTWB to identify how to estimate water supply (production) based on available and reliable data which the Project can obtain.

### **(3) Irregular Billing (Output-1)**

JICA Expert Team supports FCTWB on re-evaluation of the system operations, also review and preparation of SOP.

### **(4) Unsuccessful Results of the Pilot Project (Output-2)**

JICA Expert Team supports FCTWB to repeat NRW reduction operations with focusing on major consumers in Garki I pilot area, identify factors responsible and analyze cost-benefit.

## **3 Modification of the Project Implementation Plan**

### **3-1 Plan of Operation**

In accordance with extension of project period for six months through revision of PDM (PDM<sub>3</sub> to

PDM<sub>4</sub>), the Project will extend all relevant activities and allocate necessary inputs for the extended period in Plan of Operation (PO<sub>3</sub> to PO<sub>4</sub>).

### **3-2 Other modifications on detailed implementation plan**

None.

## **4 Preparation by Nigerian side toward after completion of the Project**

To be considered.

## **II. Project Monitoring Sheet I & II (as attached)**

### **Annex**

Annex-1: List of Equipment for the Project

Annex-2: The Third Training in Japan

Annex-3: Participants in Preparation of Project Monitoring Sheets and Photos

**Project Monitoring Sheet I**

**Project Title:** The Federal Capital Territory Reduction of Non-Revenue Water Project

**Project Period:** October 2014 to March 2018

**Implementing Organization:** Federal Capital Territory Administration (FCTA) / Federal Capital Territory Water Board (FCTWB)

**Direct Beneficiaries:** FCTWB, relevant staff of FCTWB Headquarters and pilot Area Offices

**Project Site:** FCT Pilot Area Offices: Jabi, Garki I and Gudu

**Version** 3

**Dated** 22 Sep. 2016

Monitoring: 31 Jul. 2017

Narrative Summary		Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<p><b>&lt;Overall Goal&gt;</b> Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB</p>	<p><b>&lt;Project Purpose&gt;</b> Capacity of FCTWB for NRW reduction is strengthened</p>	<p><b>a.</b> Annual NRW ratio is reduced to X% (*) at the end of the year 2021</p> <p>Note (*): Target value (X%), which is expected to be determined in the medium-term strategic plan for NRW reduction, shall be tentatively filled when the final draft was approved by the Director of FCTWB, which shall be finalized when the plan is approved by FCTA</p> <p><b>a.</b> The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.</p> <p><b>b.</b> NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB.</p> <p><b>c.</b> Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level.</p> <p><b>d.</b> NRW ratio of each PMA in the last quarter of the Project reaches its respective target (**).</p> <p>Note (**): Target for each PMA is expected to be determined by the end of the first quarter of the second year.</p>	<p><b>a.</b> Date of approval of the plan</p> <p><b>b.</b> Result of monitoring by NRW Management Team</p> <p><b>c.</b> Results of joint assessment based on the criteria set by the Project</p> <p><b>d.</b> Record of NRW ratio kept by Distribution Department</p>	<p>A. Policy support for NRW reduction is not discontinued</p> <p>B. Natural disaster/ political instability/ economic crisis that affect the service area of FCTWB do not occur</p> <p>C. Activities to implement the medium-term strategic plan are not discontinued or delayed</p>	<p>None.</p> <p>Indicator <b>a:</b> None.</p> <p>Indicator <b>b:</b> None.</p> <p>Indicator <b>c:</b> Follow-up capacity development have been done in Phase-2 of the Project.</p> <p>Indicator <b>d:</b> None. Inflow data has been read in Gudu, but not in Jabi and Garki I.</p>	
<p><b>&lt;Outputs&gt;</b> 1. Level of NRW of both the service area of FCWTB and water distribution areas is monitored regularly</p>	<p>1a. Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the second year of the Project.</p> <p>1b. Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the second year of the Project.</p> <p>1c. Quarterly NRW ratio of the service area of FCTWB is reported to Management of FCTWB from the third quarter of the second year of the Project.</p> <p>1d. Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department from the first quarter of the third year of the Project.</p>	<p>1a. Monthly record of NRW ratio</p> <p>1b&amp;1c. Material for meetings submitted by the Distribution Department</p> <p>1d. Periodic records of data on water distribution management</p>	<p>A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers</p>	<p>Indicator 1a&amp;1b&amp;1c: None and delayed as a result of delay in Activities 1-2 to 1-5.</p> <p>Indicator 1d: None and delayed as a result of delay in Activities 1-6 and 1-7.</p>		
<p>2. Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices (**)</p>	<p>2a. Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations.</p> <p>2b. Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project.</p>	<p>2a. Record of NRW ratio kept by the Distribution Department</p> <p>2b. Date of approval of the manuals</p>	<p>Indicator 2a: Achieved in Gudu and Labi pilot Area Offices, but not achieved in Garki I.</p> <p>Indicator 2b: Technical manuals were prepared and provisionally approved, but reviewed and updated in Phase-2.</p>			
<p>3. A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2 (**)</p>	<p>3a. By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval.</p> <p>3b. By October 2017, an annual NRW reduction plan (2018) is incorporated in FCTWB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval.</p> <p>3c. A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project.</p> <p>3d. By November 2016, framework of water distribution management is established.</p>	<p>3a&amp;3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan</p> <p>3c. Date of approval of the manual</p> <p>3d. Implementing structure and workflow of water distribution management</p>	<p>Indicator 3a: None.</p> <p>Indicator 3b: None.</p> <p>Indicator 3c: None.</p> <p>Indicator 3d: None and delayed. Framework has not been ready due to delay in Activity 1-6, 1-7, 3-8 and 3-9.</p>			

Note (\*): NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection

Note (\*\*): A medium-term strategic plan is a five-year plan, which may include medium-term target, strategies and actions, timeframe, human resource requirement, on-the-job training mechanism, cost-benefit analysis of NRW reduction, etc. It is noted that NRW components addressed by the strategic plan are not limited to the ones mentioned in (\*) above; they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

Activities	Inputs	The Nigerian Side	The Japanese Side	Important Assumption
<p>1-1 Install bulk meters to water treatment plants 1 and 2 1-2 Measure monthly water production of water treatment plants 1, 2, 3 and 4 1-3 Tally the above water production data monthly 1-4 Calculate the monthly water consumption based on the billing data 1-5 Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4 1-6 Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system 1-7 Measure and collect data for water distribution management such as water flow of zonal meters and water pressure</p> <p>2-1 Review existing NRW reduction operations at each pilot Area Office 2-2 Conduct capacity assessment of the relevant staff of each pilot Area Office 2-3 Identify and select a Pilot Metering Area (PMA) for each pilot Area Office based on the selection criteria of PMA (3) 2-4 Prepare/update distribution network drawings for each PMA monthly 2-5 Install water flow meters to each PMA and measure in/outflows monthly 2-6 Zone each PMA into Sub Metering Areas (SMA) 2-7 Isolate a SMA by installing valves 2-8 Update the distribution network drawings for each SMA 2-9 Measure an initial level of NRW of each SMA 2-10 Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA 2-11 Develop a NRW reduction operation plan of each SMA including reduction target, for review by Head of Distribution Department 2-12 Review and approve NRW reduction operation plan of each SMA 2-13 Implement the NRW reduction operations at each SMA 2-14 Monitor the progress of the NRW reduction operations of each SMA 2-15 Measure level of NRW of each SMA at the end of the respective operations</p> <p>2-16 Prepare a report on pilot projects, covering Activity 2-1-2-15 2-17 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials</p>	<p><b>Project Personnel</b> 1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA 2. Project Manager: Director of FCTWB 3. Deputy Project Manager: HoD for Administration and Supply/FCTWB 4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce/FCTWB 5. Members of NRW Management Team (FCTWB): - Head of Special Project Unit of Distribution Department (as Coordinator) - Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department 6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS) 7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office 8. Other personnel mutually agreed upon as necessary</p> <p><b>Land, Building and Facilities</b> 1. Office building and facilities necessary for the implementation of the Project 2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each pilot Area Office, including internet connection and air conditioners 3. Chambers for flow meters and valves for the selected PMA/SMA. 4. Electric wiring to bulk/zonal meters, loggers and pressure sensors. 5. Other facilities mutually agreed upon as necessary</p> <p><b>Local Costs</b> 1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs 2. Administration and operational costs, including cost for local travel for the Project Personnel, demurrage at local customs point, licensing cost of radio application and cost for communication of telemetric device for selected zonal meter(s) and water pressure sensor(s) 3. Other costs mutually agreed upon as necessary</p>	<p><b>The Nigerian Side</b> <b>Project Personnel</b> 1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA 2. Project Manager: Director of FCTWB 3. Deputy Project Manager: HoD for Administration and Supply/FCTWB 4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce/FCTWB 5. Members of NRW Management Team (FCTWB): - Head of Special Project Unit of Distribution Department (as Coordinator) - Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department 6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS) 7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office 8. Other personnel mutually agreed upon as necessary</p>	<p><b>The Japanese Experts</b> 1. Chief Advisor / NRW Reduction Planning / Water Distribution Management 1 2. Deputy Chief Advisor / NRW Reduction Planning 3. NRW Reduction Operations Management 4. Leakage Detection Technology 5. Commercial Loss 6. Hydraulic Analysis / GIS 7. Procurement Manager / Coordinator 8. Facility Design / Construction Supervision 9. Equipment Design / Installation 10. Water Distribution Management 2 11. Remote Monitoring 12. Other experts mutually agreed upon as necessary</p> <p><b>Equipment</b> 1. Bulk meters and loggers for water treatment plants 2. Water flow meters, valves, and customer meters for SMA 3. Leakage detection equipment for PMA 4. Pipe repair equipment for PMA 5. Vehicles (Pick-ups) 6. Generator for project office 7. Zonal meters, loggers and water pressure sensors 8. Telemetric monitoring system with standby power generating facility for selected zonal meter(s) and/or water pressure sensor(s) 9. Other equipment mutually agreed upon as necessary</p> <p><b>Facilities</b> 1. Modification of existing billing system 2. Chambers for bulk meters for water treatment plants, zonal meters and water pressure sensors <b>Training of the Nigerian Project Personnel</b> 1. Four persons mutually agreed upon will be trained in Japan annually 2. GIS training in Nigeria</p>	<p><b>Important Assumption</b> A. Natural disaster / political / instability / economic crisis that affect the Project activities do not occur.</p> <p><b>Pre-Conditions</b> A. Furnished offices for Japanese Experts are secured at the Headquarters and each Pilot Area Office of FCTWB. B. Project Personnel is assigned with the finalized list</p> <p><b>Issues &amp; Countermeasures</b> <b>(1) Delay of the Project (Output-1)</b> Issue: Available monitoring period of Activities 1-2 to 1-5 is insufficient, so the Project needs at least six months for monitoring the Activities 1-2 to 1-5. Countermeasures: The Project period will be extended for six months for monitoring the Activities 1-2 to 1-5. Record of Discussion was amended for this extension in Dec. 2016, but PDM has not been revised. <b>(2) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)</b> Issue: The Project found out that data acquisition is not always available due to non-full flow of water flow inside pipelines of bulk meters as well as possibly zonal meters, and also bulk meters has suffered from electrical challenges. Countermeasures: The Project continues to monitor water flow. The Project identifies how to estimate water supply (production) based on available and reliable data which the Project can obtain with support of JICA Expert Team. And, FCTWB solves electrical challenges of bulk meters immediately after detecting the cause. <b>(3) Irregular Billing (Output-1)</b> Issue: Billing has not been regularly done due to non-constant power supply and other operational challenges, however the situation has begun to improve. Countermeasures: The Nigerian side keeps addressing improvement in power supply, and re-evaluates updated billing system operations holistically, then reviews and prepares SOP with support of JICA Expert Team. <b>(4) Unsuccessful Results of the Pilot Project (Output-2)</b> Issue: Follow-up activities for NRW reduction in PMA/SMA were conducted, however the decrease in NRW ratio in Garki 1 is not encouraging. Countermeasures: The Project needs to repeat NRW reduction in Garki 1 Pilot Area Office to achieve the target.</p>

Note (3) Selection criteria of PMA are as follows: (i) Safety for night works is secured in measuring minimum night flow. (ii) Distribution network is separated and it is easy to isolate it in measuring NRW ratio, and (iii) NRW ratio is supposedly high.

Note (4) Working Group for NRW planning would consist of Project Manager (as chair), Deputy Project Manager, Technical Managers, Head of Finance Dept., Head of Production Dept., and members of NRW Management Team.

Project Monitoring Sheet II (Plan of Operations)  
Plan of Schedule and Actual Work Path

PM Form 3-3 Project Monitoring Sheet II  
Version: 3  
Date: 22 Sep 2016  
Revised: 21 July 2016

Activities	2016																								2017				Milestones	Achievement	Remarks
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec							
3.1. Install P&ID, review & issue for approval	100%																									Completed	Installation of P&ID completed in Phase 1				
3.2. Prepare inventory list for distribution	100%																									Completed	Inventory list prepared in Phase 1				
3.3. Prepare distribution network	100%																									Completed	Distribution network prepared in Phase 1				
3.4. Prepare material list for distribution	100%																									Completed	Material list prepared in Phase 1				
3.5. Prepare distribution network	100%																									Completed	Distribution network prepared in Phase 1				
3.6. Prepare material list for distribution	100%																									Completed	Material list prepared in Phase 1				
3.7. Prepare distribution network	100%																									Completed	Distribution network prepared in Phase 1				
3.8. Prepare material list for distribution	100%																									Completed	Material list prepared in Phase 1				
3.9. Prepare distribution network	100%																									Completed	Distribution network prepared in Phase 1				
3.10. Prepare material list for distribution	100%																									Completed	Material list prepared in Phase 1				
3.11. Prepare distribution network	100%																									Completed	Distribution network prepared in Phase 1				
3.12. Prepare material list for distribution	100%																									Completed	Material list prepared in Phase 1				



Project Monitoring Sheet II (Plan of Operations)  
Plan of Schedule and Actual Work Performed

Activity	Phase	Start	End	Status	Remarks
1. Review of design documents	Phase 1	2014-10-01	2014-10-31	Completed	
2. Review of design documents	Phase 1	2014-11-01	2014-11-30	Completed	
3. Review of design documents	Phase 1	2014-12-01	2014-12-31	Completed	
4. Review of design documents	Phase 1	2015-01-01	2015-01-31	Completed	
5. Review of design documents	Phase 1	2015-02-01	2015-02-28	Completed	
6. Review of design documents	Phase 1	2015-03-01	2015-03-31	Completed	
7. Review of design documents	Phase 1	2015-04-01	2015-04-30	Completed	
8. Review of design documents	Phase 1	2015-05-01	2015-05-31	Completed	
9. Review of design documents	Phase 1	2015-06-01	2015-06-30	Completed	
10. Review of design documents	Phase 1	2015-07-01	2015-07-31	Completed	
11. Review of design documents	Phase 1	2015-08-01	2015-08-31	Completed	
12. Review of design documents	Phase 1	2015-09-01	2015-09-30	Completed	
13. Review of design documents	Phase 1	2015-10-01	2015-10-31	Completed	
14. Review of design documents	Phase 1	2015-11-01	2015-11-30	Completed	
15. Review of design documents	Phase 1	2015-12-01	2015-12-31	Completed	
16. Review of design documents	Phase 1	2016-01-01	2016-01-31	Completed	
17. Review of design documents	Phase 1	2016-02-01	2016-02-28	Completed	
18. Review of design documents	Phase 1	2016-03-01	2016-03-31	Completed	
19. Review of design documents	Phase 1	2016-04-01	2016-04-30	Completed	
20. Review of design documents	Phase 1	2016-05-01	2016-05-31	Completed	
21. Review of design documents	Phase 1	2016-06-01	2016-06-30	Completed	
22. Review of design documents	Phase 1	2016-07-01	2016-07-31	Completed	
23. Review of design documents	Phase 1	2016-08-01	2016-08-31	Completed	
24. Review of design documents	Phase 1	2016-09-01	2016-09-30	Completed	
25. Review of design documents	Phase 1	2016-10-01	2016-10-31	Completed	
26. Review of design documents	Phase 1	2016-11-01	2016-11-30	Completed	
27. Review of design documents	Phase 1	2016-12-01	2016-12-31	Completed	
28. Review of design documents	Phase 1	2017-01-01	2017-01-31	Completed	
29. Review of design documents	Phase 1	2017-02-01	2017-02-28	Completed	
30. Review of design documents	Phase 1	2017-03-01	2017-03-31	Completed	
31. Review of design documents	Phase 1	2017-04-01	2017-04-30	Completed	
32. Review of design documents	Phase 1	2017-05-01	2017-05-31	Completed	
33. Review of design documents	Phase 1	2017-06-01	2017-06-30	Completed	
34. Review of design documents	Phase 1	2017-07-01	2017-07-31	Completed	
35. Review of design documents	Phase 1	2017-08-01	2017-08-31	Completed	
36. Review of design documents	Phase 1	2017-09-01	2017-09-30	Completed	
37. Review of design documents	Phase 1	2017-10-01	2017-10-31	Completed	
38. Review of design documents	Phase 1	2017-11-01	2017-11-30	Completed	
39. Review of design documents	Phase 1	2017-12-01	2017-12-31	Completed	
40. Review of design documents	Phase 1	2018-01-01	2018-01-31	Completed	
41. Review of design documents	Phase 1	2018-02-01	2018-02-28	Completed	
42. Review of design documents	Phase 1	2018-03-01	2018-03-31	Completed	
43. Review of design documents	Phase 1	2018-04-01	2018-04-30	Completed	
44. Review of design documents	Phase 1	2018-05-01	2018-05-31	Completed	
45. Review of design documents	Phase 1	2018-06-01	2018-06-30	Completed	
46. Review of design documents	Phase 1	2018-07-01	2018-07-31	Completed	
47. Review of design documents	Phase 1	2018-08-01	2018-08-31	Completed	
48. Review of design documents	Phase 1	2018-09-01	2018-09-30	Completed	
49. Review of design documents	Phase 1	2018-10-01	2018-10-31	Completed	
50. Review of design documents	Phase 1	2018-11-01	2018-11-30	Completed	
51. Review of design documents	Phase 1	2018-12-01	2018-12-31	Completed	
52. Review of design documents	Phase 1	2019-01-01	2019-01-31	Completed	
53. Review of design documents	Phase 1	2019-02-01	2019-02-28	Completed	
54. Review of design documents	Phase 1	2019-03-01	2019-03-31	Completed	
55. Review of design documents	Phase 1	2019-04-01	2019-04-30	Completed	
56. Review of design documents	Phase 1	2019-05-01	2019-05-31	Completed	
57. Review of design documents	Phase 1	2019-06-01	2019-06-30	Completed	
58. Review of design documents	Phase 1	2019-07-01	2019-07-31	Completed	
59. Review of design documents	Phase 1	2019-08-01	2019-08-31	Completed	
60. Review of design documents	Phase 1	2019-09-01	2019-09-30	Completed	
61. Review of design documents	Phase 1	2019-10-01	2019-10-31	Completed	
62. Review of design documents	Phase 1	2019-11-01	2019-11-30	Completed	
63. Review of design documents	Phase 1	2019-12-01	2019-12-31	Completed	
64. Review of design documents	Phase 1	2020-01-01	2020-01-31	Completed	
65. Review of design documents	Phase 1	2020-02-01	2020-02-28	Completed	
66. Review of design documents	Phase 1	2020-03-01	2020-03-31	Completed	
67. Review of design documents	Phase 1	2020-04-01	2020-04-30	Completed	
68. Review of design documents	Phase 1	2020-05-01	2020-05-31	Completed	
69. Review of design documents	Phase 1	2020-06-01	2020-06-30	Completed	
70. Review of design documents	Phase 1	2020-07-01	2020-07-31	Completed	
71. Review of design documents	Phase 1	2020-08-01	2020-08-31	Completed	
72. Review of design documents	Phase 1	2020-09-01	2020-09-30	Completed	
73. Review of design documents	Phase 1	2020-10-01	2020-10-31	Completed	
74. Review of design documents	Phase 1	2020-11-01	2020-11-30	Completed	
75. Review of design documents	Phase 1	2020-12-01	2020-12-31	Completed	
76. Review of design documents	Phase 1	2021-01-01	2021-01-31	Completed	
77. Review of design documents	Phase 1	2021-02-01	2021-02-28	Completed	
78. Review of design documents	Phase 1	2021-03-01	2021-03-31	Completed	
79. Review of design documents	Phase 1	2021-04-01	2021-04-30	Completed	
80. Review of design documents	Phase 1	2021-05-01	2021-05-31	Completed	
81. Review of design documents	Phase 1	2021-06-01	2021-06-30	Completed	
82. Review of design documents	Phase 1	2021-07-01	2021-07-31	Completed	
83. Review of design documents	Phase 1	2021-08-01	2021-08-31	Completed	
84. Review of design documents	Phase 1	2021-09-01	2021-09-30	Completed	
85. Review of design documents	Phase 1	2021-10-01	2021-10-31	Completed	
86. Review of design documents	Phase 1	2021-11-01	2021-11-30	Completed	
87. Review of design documents	Phase 1	2021-12-01	2021-12-31	Completed	
88. Review of design documents	Phase 1	2022-01-01	2022-01-31	Completed	
89. Review of design documents	Phase 1	2022-02-01	2022-02-28	Completed	
90. Review of design documents	Phase 1	2022-03-01	2022-03-31	Completed	
91. Review of design documents	Phase 1	2022-04-01	2022-04-30	Completed	
92. Review of design documents	Phase 1	2022-05-01	2022-05-31	Completed	
93. Review of design documents	Phase 1	2022-06-01	2022-06-30	Completed	
94. Review of design documents	Phase 1	2022-07-01	2022-07-31	Completed	
95. Review of design documents	Phase 1	2022-08-01	2022-08-31	Completed	
96. Review of design documents	Phase 1	2022-09-01	2022-09-30	Completed	
97. Review of design documents	Phase 1	2022-10-01	2022-10-31	Completed	
98. Review of design documents	Phase 1	2022-11-01	2022-11-30	Completed	
99. Review of design documents	Phase 1	2022-12-01	2022-12-31	Completed	
100. Review of design documents	Phase 1	2023-01-01	2023-01-31	Completed	



## List of Equipment for the Project

No.	Equipment	Specification		Hand-over	Remarks
		Japan	Nigeria		
		Quantity	Actual		
		Plan	Actual		
<b>For Activity 1-2</b>					
1	Ultrasonic flow meter (stationary, 220m)	✓	2	2	Including installation, commissioning and training
2	Ultrasonic flow meter (stationary, 300m)	✓	2	2	Including installation, commissioning and training
3	Data logger (stationary)	✓	1	1	for the above No.1&2 ultrasonic flow meters
<b>For Activity 1-6</b>					
1	Ultrasonic flow meter (stationary)	✓	6	6	Including installation, commissioning and training
2	Ultrasonic flow meter (stationary)	✓	3	3	Including installation, commissioning and training
3	Ultrasonic flow meter (stationary)	✓	2	2	Including installation, commissioning and training
4	Ultrasonic flow meter (stationary)	✓	2	2	Including installation, commissioning and training
5	Ultrasonic flow meter (stationary)	✓	1	1	Including installation, commissioning and training
6	Data logger (stationary)	✓	13	13	for the above No.1-5 ultrasonic flow meters
7	Data logger (portable)	✓	2	2	
8	Remote Monitoring System	✓	2	2	Pilot system
9	Solar System	✓	8	8	for the above ultrasonic flow meter
10	Solar System	✓	2	2	for the above ultrasonic flow meter
11	Solar System	✓	2	2	for the above ultrasonic flow meter and telemetry system
12	Solar System	✓	1	1	for the above ultrasonic flow meter
<b>For Activity 2-4 and 2-8</b>					
1	GIS software	✓	1	1	Software has been adopted by AGIS. V13.1
2	GIS software	✓	1	1	Mainly for data input
3	Plotter (A0)	✓	1	1	
4	GPS terminal	✓	2	2	Garmin
5	Personal computer	✓	2	2	
6	Anti-virus software	✓	2	2	for the above PCs (No.5)
7	UPS	✓	2	2	
<b>For Activity 2-5</b>					
1	Ultrasonic flow meter (stationary)	✓	1	1	
2	Data logger (portable)	✓	1	1	for the above No.1 ultrasonic flow meter
3	Flow meter		0	0	
4	Flow meter		0	0	
5	Flow meter		0	0	
6	Flow meter	✓	0	1	Done
7	Flow meter	✓	1	2	Done
8	Flow meter		0	0	
9	Flow meter	✓	3	3	Done
<b>For Activity 2-7</b>					
1	Slice valve		2	0	
2	Slice valve		0	0	
3	Slice valve	✓	9	1	Done
4	Slice valve	✓	12	7	Done
5	Slice valve	✓	6	8	Done
6	Slice valve		2	0	
7	Slice valve	✓	10	6	Done

## List of Equipment for the Project

No.	Equipment	Specification	Procurement in		Quantity		Hand-over	Remarks
			Japan	Nigeria	Plan	Actual		
<b>For Activity 2-10</b>								
1	Ultrasonic flow meter (portable)	Ultrasonic pulse transmit time difference method, sensors (small x3, medium x6, large x3)	✓		6	6	Done	
2	Data logger (portable)	2ch (flow and pressure), 1s - 24h record cycle, 4-20mA, 5 years battery life	✓		6	6	Done	
3	Leak noise correlator	Main unit, preamplifier and piezoelectric sensor	✓		2	2	Done	
4	Water leak detector	Acoustic type, piezoelectric sensor	✓		6	6	Done	
5	Non-metal pipe locator	Electromagnetic induction type for plastic pipe (PVC, PE)	✓		3	3	Done	
6	Metal locator	Optical and acoustical output signal, 50cm depth	✓		3	3	Done	
7	Time integral water leak detector	Automatic leak noise determination method	✓		3	3	Done	
8	Acoustic rod	1.5m length	✓		9	9	Done	
9	Distance meter	Max. 10km, 10cm scale	✓		3	3	Done	
10	Hammer drill	Dia. 38mm, 270rpm, 3,000 stroke/min	✓		3	3	Done	
11	Boring bar	Dia. 16mm, 1.0m length	✓		3	3	Done	
12	Drill bit	Dia. 19x800mm	✓		9	9	Done	
13	Portable residual chlorine analyzer	DPD, absorbometry, 0.02-2.00mg/L	✓		3	3	Done	
14	Metal pipe and cable locator	5m depth	✓		3	3	Done	
15	Reference meter	Portable built-in case type, 13-25mm	✓		3	3	Done	
16	Leakage quantity measurement device	13-25mm	✓		3	3	Done	
17	Personal computer	500HD, 2GB Ram, Windows 7or8, Microsoft Office installed, Mouse	✓	✓	3	3	Done	
18	Anti-virus software		✓	✓	3	3	Done	for the above PCs (No.17)
19	UPS	1.2kVA	✓	✓	3	3	Done	
20	Inkjet printer	A4, Color, All-in-one	✓	✓	3	3	Done	
21	Digital camera	Compact type, Optical zoom, 10 mega-pixel (min), LCD	✓	✓	3	3	Done	
<b>For Activity 2-13</b>								
1	Generator	200V, 6.5kVA	✓		3	3	Done	
2	Asphalt cutter	3600RPM, 13kW	✓		3	3	Done	
3	Concrete breaker		✓		3	3	Done	
4	Small-sized dewatering pump	2"	✓		3	3	Done	
5	Small-sized tamper		✓		3	3	Done	
6	Electric drum	50m	✓		3	3	Done	
7	Customer meter	Dia. 23" with fittings, conventional type			388	0	-	
8	Customer meter	Dia. 1" with fittings, conventional type	✓		259	600	Done	
9	Customer meter	Dia. 50mm with fittings, conventional type			89	0	-	
10	Customer meter	Dia. 80mm with fittings, conventional type			23	0	-	
11	Customer meter	Dia. 100mm with fittings, conventional type			7	0	-	
12	Compact Reciprocating Saw	Pipe cutting	✓		3	3	Done	
<b>For Output 2</b>								
1	Pickup truck for pilot sites		✓		2	2	Done	
<b>For Operation of the Project</b>								
1	Laser printer	A4, B/W	✓		1	1	Done	
2	Inkjet printer	A3, Color	✓		1	1	Done	
3	Multifunction copier	A3, B/W	✓		1	1	Done	
4	Graphic/movie editing software	Windows Movie Maker, Microsoft Powerpoint	✓		1	1	Done	Free or preinstalled softwares to be utilized.
5	Projector	3,000 Lummen, HDMI, VGA, USB port	✓		1	1	Done	

### The Third Training in Japan

**Course Name:** The Federal Capital Territory Reduction of Non-Revenue Water Project, NRW Reduction (Strategy)

**Purpose:**

The participants visit “Yokohama City”, as a model case or benchmark, the second largest city in Japan,

- To understand institutions and organization structure of integrated water supply services, and planning, designing and O&M and coordination and feedback among them.
- To understand bases, knowledge and methodology of water supply services/O&M including non-revenue water reduction.

The participants compare them with those of FCT and utilize them in contribution for further improvement and implementation in development and O&M of water supply services of FCT.

**Programme:**

- Water Supply O&M System
- Water Supply Control and Management
- History of Waterworks Technology
- Water Distribution Management
- Outline of Water Supply Installation (Service Connection)
- NRW Contents / Water Pressure Control
- Water Treatment Plant
- Water Leakage Detection
- Pipeline Information Management
- Water Meter Maintenance
- Construction Management and As-built Drawing Making
- Self-support Accounting System and PPP
- Management (Business) Plan
- Water Demand Forecasting (Facility Development Planning)
- Replacement of Aged Pipes

**Period:** 9<sup>th</sup> to 15<sup>th</sup> July 2017

**Receiving Water Utility:** Yokohama City Waterworks Bureau

**Participants:** 6 delegation officials (FCDA: 4, FCTWB: 2)

Name	Organ.	Position in FCTWB
Engr. AHMAD Shehu Hadi	FCDA	Director, Department of Engineering Services
Engr. EZEHOA Ferdinand Obiora	FCDA	Deputy Director, Water & Sewage, Department of Engineering Services
Engr. OSAYANDE Joseph Uyi	FCDA	Deputy Director, Department of Engineering Design and Evaluation
Engr. OLUWADAMISI Emmanuel Abiodun	FCDA	Deputy Director. Engineering PPP, Department of Mass Housing / PPP
Engr. ALIYU Abubakar Usman	FCTWB	Head of Department, Department of Production,
Engr. LAWAL Rasaki Abolade	FCTWB	Assistant Director, Distribution Department

## Participants in Preparation of Draft Monitoring Sheets

### Day 1: 31<sup>st</sup> July 2017 for Draft Project Monitoring Sheet II

S/N	NAME	POSITION
1	Lawal Abolade R.	Head [Special Projects] (Coordinator)
2	Rabiu M.Kabir	Head [NRW]
3	Dikko Musa	Head[PL/WC]
4	Muazo Aliyu S.B	Ag Head[Comm.]
5	Mohammed E Gana	AAM[Dist.] Garki1
6	Choji Pam	Ag. Area Manager Garki1
7	Aluko Tope	Head[E&M]
8	Amos Bulus	PEE[M&E]
9	Mumini Raifu	Ag. Area Manager Gwarinpa
10	Sulaiman A Muhammad	AgArea Manager Jabi
11	Abubakar Danladi	Distribution Dept.
12	Abbas A. Ahmed	Head[Public Relation]
13	Ibrahim Umar	Ag Area Manager Gudu
14	Muhammed Dauda	Pipeline Unit
15	Kenneth Madu	Snr. Craftman
16	Titus Dawan	Garki1[Commerce]
17	Ezeh Hillary	Surveyor/ GIS
18	Rose Akpan	Head[Billing]
19	Abdularahman shehu Sani	Head[prepaid Meter]
20	Shehu Suleiman	Head[GIS]
21	Saliyu Sadiq	AAM [Dist.] Jabi
22	Abdul Yusuf	Superintendent[P&P Estate]
23	Abdul Ozumi	AAM[Dist.] Gudu
24	Akinori Miyoshi	CA, JICA Expert Team

### Day 2: 1<sup>st</sup> August 2017 for Draft Project Monitoring Sheet I

S/N	NAME	POSITION
1	Nahuche A.A	Ag Director (Project Manager)
2	Lawal Abolade R.	Head [Special Projects] (Coordinator)
3	Rabiu M.Kabir	Head [NRW]
4	Dikko Musa	Head [PL&Wc]
5	Pheobe Ocheja	Ag Head [Admin&Supply]
6	Muazu Aliyu S. B	Ag Head[Commerce]
7	Abbas Ahmed	Head[Public Relation]
8	Rose Akpan	Head[Billing]
9	Hasfat Ahmed Lawi	Head[Finance and Account]
10	Aliyu Ahmad Usuman	Asst. Director
11	Ezeh Hillary	Surveyor[GIS]
12	Akinori Miyoshi	CA, JICA Expert Team

**Day 3: 3<sup>rd</sup> August 2017 for Draft Project Monitoring Sheet Summary**

S/N	NAME	POSITION
1	Nahuche A.A	Ag Director (Project Manager)
2	Lawal Abolade R.	Head [Special Projects] (Coordinator)
3	Rabiu M.Kabir	Head [NRW]
4	Dikko Musa	Head [PL&Wc]
5	Hasfat Ahmed Lawi	Head[Finance and Account]
6	Aliyu Ahmad Usuman	Asst. Director
7	Muazu Aliyu S. B	Ag Head[Commerce]
8	Pheobe Ocheja	Ag Head [Admin&Supply]
9	Agbontaen O. S.	Head [Reservoirs&Production]
10	Yahaya O. Kуйke	Audit
11	Akinori Miyoshi	CA, JICA Expert Team

**Day 4: 21<sup>st</sup> August 2017 for Draft Project Monitoring Sheet Summary**

S/N	NAME	POSITION
1	Nahuche A.A	Ag Director (Project Manager)
2	Lawal Abolade R.	Head [Special Projects] (Coordinator)
3	Rabiu M.Kabir	Head [NRW]
4	Dikko Musa	Head [PL&Wc]
5	Hasfat Ahmed Lawi	Head[Finance and Account]
6	Aliyu Ahmad Usuman	Asst. Director
7	Pheobe Ocheja	Ag Head [Admin&Supply]
8	Agbontaen O. S.	Head [Reservoirs&Production]
9	Shehu Suleiman	Head [GIS]
10	Bamidele Olatunji	Head [International Cooperation]
11	Akinori Miyoshi	CA, JICA Expert Team

**Monitoring Mission Members from JICA Headquarters (21<sup>st</sup> to 24<sup>th</sup> August 2017)**

S/N	NAME	POSITION
1	Yoshiki Omura	Senior Advisor in Urban Water Supply
2	Hiroki Ishimaru	Project Officer, Water Resources Group, Global Environment Department

### Photos of Preparation of Monitoring Sheet

	<p><b>Day 1:</b> 31<sup>st</sup> July 2017</p> <p>Preparation of Draft Project Monitoring Sheet II (Attendance: NRW Management Team members and Action Team Members)</p>
	<p><b>Day 2:</b> 1<sup>st</sup> August 2017</p> <p>Preparation of Draft Project Monitoring Sheet I (Attendance: Project Manager, Deputy Project Manager, NRW Management Team members and FCTWB Management)</p>
	<p><b>Day 3:</b> 3<sup>rd</sup> August 2017</p> <p>Preparation of Draft Project Monitoring Summary (Attendance: Project Manager, Deputy Project Manager, NRW Management Team members and FCTWB Management)</p>
	<p><b>Day 4:</b> 21<sup>st</sup> August 2017</p> <p>Revision of Draft Project Monitoring Sheet I, II and Summary (Attendance: Project Manager, Deputy Project Manager, NRW Management Team members and FCTWB Management)</p>

To Chief Representative of JICA Nigeria Office

## PROJECT MONITORING SHEETS

**Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project**

**Version of the Sheet: Ver. 6 (Term covered: August, 2017 - June, 2018)**

**Name: Akinori Miyoshi**

**Title: Chief Advisor**

**Submission Date: 28 June 2018**

### I. Summary

#### 1 Progress

##### 1-1 Progress of Inputs

###### [The Nigerian Side]

###### Project Personnel

All project members including Project Director, Project Manager, Deputy Project Manager, Technical Managers, Non-Revenue Water (NRW) Management Team members, NRW Action Team members have been involved in the Project.

###### Land, Building and Facilities

Office spaces and necessary facilities at the Federal Capital Territory Water Board (FCTWB) have been provided for the Japanese side.

###### Local Costs

Cost for operation and maintenance of the provided equipment, and also administrative and operational costs for local traveling, demurrage and communication of telemetric device have been provided. However, these costs had been paid temporarily by the Japanese side because of delay in release of the Counterpart Fund, which were refunded.

###### [The Japanese Side]

###### JICA Experts

Japan International Cooperation Agency (JICA) Expert Team consisting of a Chief Advisor and members for nine areas of expertise were assigned to the works in Nigeria for 22.1 person-months between August 2017 and June 2018 (106.6 person-months from the commencement of the Project in November 2014).

###### Equipment

Zonal meters, data loggers, telemetric monitoring system and solar powering systems were installed from June to September 2017, and additional adjustment was done in November 2017.

## Facilities

There are no inputs during this monitoring period.

## Training of the Nigerian Project Personnel

There are no inputs during this monitoring period.

## **1-2 Progress of Activities**

**[Activities for Output-1: 1. Level of NRW of both the service area of FCWTB and water distribution areas is monitored and estimated.]**

No	Activity	Previous Monitoring (as at Jul. 2017) *Progress against Phase-2 Work Plan	Current Monitoring (as at Jun.2018) *Progress against Phase-2 Work Plan
1-1	Install bulk meters to water treatment plants 1 and 2	Completed.	Completed.
1-2	Measure/estimate water production of water treatment plants 1, 2, 3 and 4	Progress: 0%, Behind: 7.0 months Flow data measurement has not always been available, which is due to non-full of water flow inside pipelines and electrical challenges (fuse burning). The Project needs at least 6 months for monitoring this Activity.	Completed in February 2018.
1-3	Tally the above water production data/estimation	Progress: 0%, Behind: 7.0 months The Project needs at least 6 months for monitoring this Activity.	Completed in February 2018.
1-4	Calculate the water consumption based on the billing data	Completed. Zonal coding is ongoing for water distribution management. The Project needs at least 6 months for monitoring this Activity. Re-evaluation and update of the modified billing system is necessary. Constant power supply, adequate provision for consumables and SOP are necessary.	Completed. However, customers' zonal coding is still ongoing as a fundamental condition for water distribution management. Periodic billed consumption has been not recorded because of non regular meter reading and billing. Constant power supply, adequate provision for consumables and SOP are necessary.
1-5	Calculate NRW ratio of the service area of FCTWB using the results obtained from Activity 1-3 and 1-4	Progress: 0%, Behind: 7.0 months The Project needs at least 6 months for monitoring this Activity.	Completed in February 2018.
1-6	Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system	Progress :95%, Behind: 0.0 months Setting-up of zonal meters has not been done properly due to non-full of water flow inside pipelines (Automatic Gain Adjustment for data correction). Constant power supply and adequate provision for logistics are necessary.	Completed in August 2017. After completion, loggers' failure were observed at Tank 2 and Tank Kubwa due to power instability and lightning, but they were replaced or fixed. Solar panel for zonal meter located at roof-top of Tank 5 was stolen in February 2018.
1-7	Measure/estimate and collect data for water distribution management such as water flow of zonal meters and water pressure	Progress: 0%, Behind: 0.0 months The Activity will be implemented after the completion of Activity 1-4 and 1-6.	Progress: 85%, Behind: 0.0 months The Activity will be completed after the completion of customers' zonal coding stated in Activity 1-4, before July 2018.



**[Activities for Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

No	Activity	Previous Monitoring (as at Jul. 2017) *Progress against Phase-2 Work Plan	Current Monitoring (as at Jun.2018) *Progress against Phase-2 Work Plan
2-1	Review existing NRW reduction operations at each pilot Area Office	Completed.	Completed.
2-2	Conduct capacity assessment of organization and the relevant staff	Progress: 50%, Behind: 2.0 months Assessment will be done after the completion of follow-up activities in Garki I and also NRW monitoring in pilot Area offices.	Progress: 65%, Behind: 10.0 months Assessment was done partially after the completion of pilot projects, and will be completed after NRW monitoring in pilot Area offices in July and August 2018.
2-3	Identify and select a Pilot Metering Area (PMA) for each Pilot Area Office based on the selection criteria of PMA	Completed.	Completed.
2-4	Prepare/update distribution network drawings for each PMA	Completed. Refer to Activity 3-3.	Completed.
2-5	Install water flow meters to each PMA and measure in/outflows monthly	Completed (installation only). Meter reading in Gudu is ongoing. Adequate provision for logistics and SOP are necessary for monitoring monthly in/outflows.	Completed. However, a mechanical PMA meter in Jabi PMA is not functioning, and data from an ultrasonic PMA meter is not transferred to portable logger in Garki I PMA.
2-6	Zone each PMA into Sub Metering Areas (SMA)	Completed.	Completed.
2-7	Isolate a SMA by installing valves	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but provisionally completed in Garki I because of unsuccessful NRW reduction. Discrepancy between as-built drawings and actual situation on ground exist, and updated as-built drawings are not available. Information management with standardization and quality should be improved.	Completed in October 2017.
2-8	Update the distribution network drawings for each SMA	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but provisionally completed in Garki I because of unsuccessful NRW reduction. Refer to Activity 3-3.	Completed in October 2017.
2-9	Measure an initial level of NRW of each SMA	Progress: 90%, Behind: 2.0 months (Follow-up)	Completed in October 2017.

No	Activity	Previous Monitoring (as at Jul. 2017) *Progress against Phase-2 Work Plan	Current Monitoring (as at Jun.2018) *Progress against Phase-2 Work Plan
		<p>Completed in Gudu and Jabi Area Offices, but provisionally completed in Garki I because of unsuccessful NRW reduction.</p> <p>Activity in Garki I will be repeated.</p> <p>Administrative complication with respect to Commerce operations (mixture of customer categories, meter types, reading divisions, water tariff, etc.) has suffered the Activity. Streamlining, simplification, uniform management are necessary.</p>	
2-10	Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA	<p>Progress: 90%, Behind: 2.0 months (Follow-up)</p> <p>Completed in Gudu and Jabi Area Offices, but provisionally completed in Garki I because of unsuccessful NRW reduction.</p> <p>Activity in Garki I will be repeated and will be kept in pilot Area offices based on results of Activity 2-5.</p>	Completed in October 2017.
2-11	Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of Distribution Department	<p>Progress: 90%, Behind: 2.0 months (Follow-up)</p> <p>Completed in Gudu and Jabi Area Offices, but provisionally completed in Garki I because of unsuccessful NRW reduction.</p> <p>Revision will be done in Garki I.</p>	Completed in October 2017.
2-12	Review and approve NRW reduction operation plan of each SMA	<p>Progress: 90%, Behind: 2.0 months (Follow-up)</p> <p>Completed in Gudu and Jabi Area Offices, but not completed in Garki I because of unsuccessful NRW reduction.</p> <p>Revision will be done in Garki I.</p>	Completed in October 2017.
2-13	Implement NRW reduction operations at each SMA	<p>Progress: 90%, Behind: 2.0 months (Follow-up)</p> <p>Completed in Gudu and Jabi Area Offices, but not completed in Garki I because of unsuccessful NRW reduction.</p> <p>Further operations will be done in Garki I.</p>	Completed in October 2017.
2-14	Monitor the progress of the NRW reduction operations of each SMA	<p>Progress: 90%, Behind: 2.0 months (Follow-up)</p> <p>Completed in Gudu and Jabi Area Offices, but not completed in Garki I because of unsuccessful NRW reduction.</p> <p>Further operations will be done in Garki I.</p>	Completed in October 2017.
2-15	Measure level of NRW of each SMA at the end of the respective operations	<p>Progress: 90%, Behind: 2.0 months (Follow-up)</p> <p>Completed in Gudu and Jabi Area Offices, but not completed in Garki I</p>	Completed in October 2017.

No	Activity	Previous Monitoring (as at Jul. 2017) *Progress against Phase-2 Work Plan	Current Monitoring (as at Jun.2018) *Progress against Phase-2 Work Plan
		because of unsuccessful NRW reduction. Further operations will be done in Garki I.	
2-16	Prepare a report on pilot projects, covering Activity 2-1~2-15	Progress: 90%, Behind: 2.0 months (Follow-up) Completed in Gudu and Jabi Area Offices, but not completed in Garki I because of unsuccessful NRW reduction. Revision will be done after the completion of Activity 2-10 to 2-15.	Completed in October 2017.
2-17	Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers & meter readers), incl. audio visual materials	Progress: 50%, Behind: 0.0 months (Follow-up) Revision ongoing. Finalization will be done after the completion of Activity 2-10 to 2-16.	Completed in May 2018.

**[Activities for Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

No	Activity	Previous Monitoring (as at Jul. 2017) *Progress against Phase-2 Work Plan	Current Monitoring (as at Jun.2018) *Progress against Phase-2 Work Plan
3-1	Establish a Working Group for NRW reduction planning	Reviewed and completed.	Completed.
3-2	Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB	Reviewed and Completed. Lack of HRD planning of FCTWB's staff. FCTWB should have comprehensive training programme including OJT and internal training.	Completed.
3-3	Conduct hydraulic and water pressure distribution analyses of the pipeline networks	Progress: 00%, Behind: 2.0 months To be completed by November 2017. Close communication and feed-back with FCDA should be enhanced. Pipeline and customer information should be entered extensively into GIS for all service areas.	Completed in November 2017.
3-4	Develop outlines of the medium-term strategic plan and its annual NRW reduction plan (approval by the Director)	Progress: 25%, Behind: 0.0 months Draft content was prepared and officers were selected provisionally. Scenarios of NRW reduction strategic plan has been discussed. To be completed by November 2017.	Completed in November 2017.
3-5	Develop the first medium-term strategic plan (2019-2023) for approval by FCTA	Progress: 00%, Behind: 0.0 months To be completed by March 2018.	Progress: 95%, Behind: 3.0 months Working Group and Advisory Group members have been involved in documentation and check/comments. To be completed by the end of June 2018.
3-6	Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA	Progress: 00%, Behind: 0.0 months To be completed by March 2018.	Progress: 80%, Behind: 1.0 months Working Group, particularly NRW Unit has been involved in documentation based on the first medium-term strategic plan (2019-2023). To be completed by the end of July 2018.
3-7	Develop a planning manual for NRW reduction	Progress: 00%, Behind: 0.0 months To be completed by March 2018.	Progress: 80%, Behind: 0.0 months JICA Expert Team and NRW Unit have been involved in preparation. To be completed by the end of July 2018.
3-8	Review existing plans, activities and implementing structure, etc. related to water distribution management	Progress: 80%, Behind: 0.0 months Some Area Offices submitted the required information. To be completed by October 2017. Close communication and feed-back among FCTWB's divisions should be enhanced. Pipeline and customer information should be entered extensively into GIS for all service areas.	Completed in October 2017.
3-9	Establish framework of water distribution management	Progress: 25%, Behind: 0.0 months To be completed by October 2017.	Progress: 85%, Behind: 8.5 months The Activity will be completed after

No	Activity	Previous Monitoring (as at Jul. 2017) *Progress against Phase-2 Work Plan	Current Monitoring (as at Jun.2018) *Progress against Phase-2 Work Plan
			the completion of customers' zonal coding stated in Activity 1-4, before July 2018.

### 1-3 Achievement of Output

**[Output-1: 1. Level of NRW of both the service area of FCWTB and water distribution areas is monitored and estimated.]**

No	Indicator	Previous Monitoring (as at Jul. 2017)	Current Monitoring (as at Jun.2018)
1a	Record of NRW ratio is kept by NRW Unit.	None and delayed as a result of delay in Activities 1-2 to 1-5.	NRW ratio was estimated because of data deficiency at bulk meters and recorded. Periodic billed consumption has been not calculated easily because of non monthly meter reading and billing cycle.
1b	NRW ratio of the service area of FCTWB is reported to its Joint Management Meeting.	None and delayed as a result of delay in Activities 1-2 to 1-5.	NRW ratio was estimated because of data deficiency at bulk meters and reported.
1c	NRW ratio of the service area of FCTWB is reported to Management of FCTWB.	None and delayed as a result of delay in Activities 1-2 to 1-5.	NRW ratio was estimated because of data deficiency at bulk meters and reported.
1d	Periodic records of data and estimation on water distribution management such as water flow of zonal meters and water pressure are kept by NRW Unit.	None and delayed as a result of delay in Activities 1-6 and 1-7.	Water flow has been recorded by zonal meters although data deficiency. Billed consumption have been not calculated due to delay in customers' zonal coding.

#### **Verification of Achievement and Implementing Process**

Based on preliminary investigation by the Project Team, FCTWB had communicated with FCDA to discuss solutions to non-full water flow inside pipelines and interference along trunk mains by water flow from new water treatment plant (Phases 3&4) to water flow from old plant (Phases 1&2) at the upstream side of bulk flow meters. Then, FCTA started relocation works of injection point from the upstream side to the downstream side in June 2018.

**[Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]**

No	Indicator	Previous Monitoring (as at Jul. 2017)	Current Monitoring (as at Jun.2018)																																																																																																																																																						
2a	Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations.	<p>Achieved in Gudu and Jabi pilot Area Offices, but not achieved in Garki I.</p> <p style="text-align: center;">NRW Ratio (%)</p> <table border="1"> <thead> <tr> <th></th> <th>Bef (%)</th> <th>Aft (%)</th> <th>Red. Point</th> <th>Target (%)</th> <th>status</th> </tr> </thead> <tbody> <tr> <td colspan="6">Gudu</td> </tr> <tr> <td>SMA-1</td> <td>52.0</td> <td>14.3</td> <td>37.7</td> <td>31.2</td> <td>OK</td> </tr> <tr> <td>SMA-2</td> <td>53.9</td> <td>28.7</td> <td>25.2</td> <td>32.3</td> <td>OK</td> </tr> <tr> <td colspan="6">Jabi</td> </tr> <tr> <td>SMA-2</td> <td>45.6</td> <td>21.1</td> <td>24.5</td> <td>27.4</td> <td>OK</td> </tr> <tr> <td>SMA-3</td> <td>87.6</td> <td>42.6</td> <td>45.0</td> <td>52.6</td> <td>OK</td> </tr> <tr> <td colspan="6">Garki I</td> </tr> <tr> <td>SMA-1</td> <td>85.1</td> <td>62.2</td> <td>22.9</td> <td>51.1</td> <td>No</td> </tr> <tr> <td>SMA-2</td> <td>74.8</td> <td>78.2</td> <td>-3.4</td> <td>44.9</td> <td>Non</td> </tr> <tr> <td>SMA-3</td> <td>70.0</td> <td>53.7</td> <td>16.3</td> <td>42.0</td> <td>No</td> </tr> </tbody> </table>		Bef (%)	Aft (%)	Red. Point	Target (%)	status	Gudu						SMA-1	52.0	14.3	37.7	31.2	OK	SMA-2	53.9	28.7	25.2	32.3	OK	Jabi						SMA-2	45.6	21.1	24.5	27.4	OK	SMA-3	87.6	42.6	45.0	52.6	OK	Garki I						SMA-1	85.1	62.2	22.9	51.1	No	SMA-2	74.8	78.2	-3.4	44.9	Non	SMA-3	70.0	53.7	16.3	42.0	No	<p>Not successful in SMA-2 of Garki I due to difficulty in identifying the installed pipeline, however the Project concluded indicator was generally achieved in all three PMAs. Pilot project spent the period between Nov. 2014 and Dec. 2016 intermittently and the follow up between Mar. and Oct. 2017.</p> <p style="text-align: center;">NRW Ratio (%)</p> <table border="1"> <thead> <tr> <th></th> <th>Bef (%)</th> <th>Aft (%)</th> <th>Red. Point</th> <th>Target (%)</th> <th>status</th> </tr> </thead> <tbody> <tr> <td colspan="6">Gudu</td> </tr> <tr> <td>SMA-1</td> <td>52.0</td> <td>12.1</td> <td>39.9</td> <td>31.2</td> <td>OK</td> </tr> <tr> <td>SMA-2</td> <td>53.9</td> <td>29.9</td> <td>24.0</td> <td>32.3</td> <td>OK</td> </tr> <tr> <td>PMA</td> <td>53.3</td> <td>20.4</td> <td>32.9</td> <td>32.0</td> <td>OK</td> </tr> <tr> <td colspan="6">Jabi</td> </tr> <tr> <td>SMA-2</td> <td>45.6</td> <td>21.1</td> <td>24.5</td> <td>27.4</td> <td>OK</td> </tr> <tr> <td>SMA-3</td> <td>87.6</td> <td>42.6</td> <td>45.0</td> <td>52.6</td> <td>OK</td> </tr> <tr> <td>PMA</td> <td>70.0</td> <td>30.9</td> <td>39.1</td> <td>42.0</td> <td>OK</td> </tr> <tr> <td colspan="6">Garki I</td> </tr> <tr> <td>SMA-1</td> <td>85.1</td> <td>45.2</td> <td>39.9</td> <td>51.1</td> <td>OK</td> </tr> <tr> <td>SMA-2</td> <td>74.8</td> <td>49.3</td> <td>25.5</td> <td>44.9</td> <td>Non</td> </tr> <tr> <td>SMA-3</td> <td>70.0</td> <td>27.4</td> <td>42.6</td> <td>42.0</td> <td>OK</td> </tr> <tr> <td>PMA</td> <td>74.8</td> <td>34.7</td> <td>40.1</td> <td>44.9</td> <td>OK</td> </tr> </tbody> </table>		Bef (%)	Aft (%)	Red. Point	Target (%)	status	Gudu						SMA-1	52.0	12.1	39.9	31.2	OK	SMA-2	53.9	29.9	24.0	32.3	OK	PMA	53.3	20.4	32.9	32.0	OK	Jabi						SMA-2	45.6	21.1	24.5	27.4	OK	SMA-3	87.6	42.6	45.0	52.6	OK	PMA	70.0	30.9	39.1	42.0	OK	Garki I						SMA-1	85.1	45.2	39.9	51.1	OK	SMA-2	74.8	49.3	25.5	44.9	Non	SMA-3	70.0	27.4	42.6	42.0	OK	PMA	74.8	34.7	40.1	44.9	OK
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2b	Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce.	Technical manuals were prepared and provisionally approved, but reviewed and updated in Phase-2.	Technical manuals were reviewed and updated in May 2018. Approval process is ongoing.																																																																																																																																																						
<p><b>Verification of Achievement and Implementing Process</b></p> <p>Under the circumstances that 2017 Counterpart Fund was not released as scheduled due to delay in non-passage of 2017 appropriation and FCTA's internal process, the Project made efforts of implementation of pilot projects as follow-up activities to achieve the target with concentrated inputs including supervisors and supporters from the FCTWB Headquarters and other Area Offices from September to October 2017.</p>																																																																																																																																																									

**[Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]**

No	Indicator	Previous Monitoring (as at Jul. 2017)	Current Monitoring (as at Jun.2018)
3a	Draft medium-term strategic plan for NRW reduction (2019-2023) is submitted by FCTWB to FCTA for review and approval.	None (as planned).	Not yet. To be submitted in early July 2018, after JCC's approval of the draft medium-term strategic plan.
3b	An annual NRW reduction plan (2019) is incorporated in FCWTB's annual recurrent and capital plan (2019) for submission to FCTA for review and approval.	None (as planned).	Not yet. The incorporation can be done after FCTA's approval of the draft medium-term strategic plan and when FCWTB's annual recurrent and capital plan (2019) is prepared probably in October 2019 which is after the termination of the Project. So, FCTWB highlighted the need to modify this indicator (refer to 3-1).
3c	A planning manual for NRW reduction is approved by the Director of FCTWB.	None (as planned).	Not yet. To be approved by the end of August 2018.
3d	Framework of water distribution management is established.	None and delayed. Framework has not been ready due to delay in Activity 1-6, 1-7, 3-8 and 3-9.	Ongoing but delayed due to delay in Activity 1-7 and 3-9.
<p><b>Verification of Achievement and Implementing Process</b></p> <p>Although it took time, working and advisory groups' members contributed effectively to documentation and check/comments/advices in preparation of the draft medium-term strategic plan.</p>			

## 1-4 Achievement of the Project Purpose

### [Project Purpose: Capacity of FCTWB for NRW reduction is strengthened.]

No	Indicator	Previous Monitoring (as at Jul. 2017)	Current Monitoring (as at Jun.2018)
a	The medium-term strategic plan for NRW reduction (2019-2023) is approved by FCTA by the end of the Project.	None (as planned).	Not yet. To be approved by the end of August 2018.
b	Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level.	Follow-up capacity development have been done in Phase-2 of the Project.	Capacity development have been done in Phase-2 of the Project. Follow up to be completed by the end of August 2018.
c	NRW ratio of each PMA is monitored.	None (as planned). Inflow data has been read in Gudu, but not in Jabi and Garki I.	Partially monitored. Inflow data has been read in Gudu, but not in Jabi and Garki I due to malfunctioning of a mechanical PMA meter in Jabi and data transfer failure from an ultrasonic PMA meter to portable data logger in Garki I.
<p><b>Verification of Achievement and Implementing Process</b></p> <p>In relation to Indicator c, less awareness and ownership have caused proper reporting and information sharing on problems among FCTWB Headquarters and pilot Area Offices and then delay in prompt measures.</p>			

## 1-5 Changes of Risks and Actions for Mitigation

Although enabling law establishing autonomous FCTWB was enacted in the end of 2017 and members of governing Board of FCTWB were appointed in March 2018, FCTWB still depends financially on FCTA.

Following the past physical years 2016 and 2017, recent budget constraint of the Nigerian side including non-release or late-release of the Counterpart Fund and recurrent budget has corresponded to an important assumption "A. Natural disaster / political instability / economic crisis that affect the Project activities do not occur." in 2018, too.

Recent budget constraint has posed an impediment in the Project monitoring with adequate logistics.

## 1-6 Progress of Actions undertaken by JICA

None.

## 1-7 Progress of Actions undertaken by Nigerian side



National budget for 2018 was approved in the middle of June 2018, so FCTWB needs to request FCTA for the immediate release of the Counterpart Fund or adequate recurrent budget.

**1-8 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)**

**(1) Personnel Reassignment of the FCTWB's Project Members**

Same as the last monitoring, Technical Manager (Head of Commerce) and some Project members were reassigned since August 2017.

FCTWB needs to consider his/her experiences in the Project and assure transfer of information, knowledge and lessons learned in the Project activities to his/her successor and other members.

**(2) Delay in Release of 2018 Counterpart Fund**

As mentioned above, though national budget for 2018 was approved in the middle of June 2018, FCT budget for 2018 is still in the process of the approval. Accordingly, 2018 Counterpart Fund has not yet been released. The Nigerian side needs to keep in touch with JICA Expert Team on the status of FCT budget approval and release of the Counterpart Fund.

**(3) Preparation for FCTWB Autonomy**

As of September 2017, JICA Expert Team suggested establishing a preparatory committee, listing up and scheduling preparatory activities in expectation for autonomy. Following enactment of enabling law for autonomous FCTWB in December 2017, JICA Expert Team assisted FCTWB in financial data collection, calculation of unit cost, price and profitable tariff, then financial analysis including profit-loss statement and cash flow until 2023 in accordance with the medium-term strategic plan for NRW reduction.

In preparation for full transition of FCTWB to an autonomous agency, FCTWB should utilize these deliverables to advance step by step as scheduled.

**(4) Administrative Complication with respect to Commerce Operations**

Same as several times of the past monitoring, mixture of customer categories, meter types, reading divisions and water tariff, and irregular billing cycle and also lagged billing reflection of payment record, etc. have caused inefficiency in commerce operations affecting NRW reduction, which leads to financial losses of FCTWB and customer dissatisfaction. JICA Expert Team suggests FCTWB to solve the issues in consideration of streamlining, simplification and uniform management among relevant Units.

In preparation for full transition of FCTWB to an autonomous agency as well as implementation of NRW reduction according to the medium-term strategic plan and annual plans, these issues should be seriously discussed among governing Board and management FCWTB based on lesson learnt from the Project.

## **(5) Project Vehicle**

As a result of condition check of the project vehicle damaged by the traffic accident in Lokoja in March 2017, FCTWB concluded impossibility of repair and will purchase a new vehicle by using Counterpart Fund. Process of procurement is ongoing.

All project vehicles for NRW reduction should be used strictly for implementation of the medium-term strategic plan for NRW reduction.

## **2 Delay of Work Schedule and/or Problems (if any)**

### **2-1 Detail**

#### **(1) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)**

Through monitoring of bulk and zonal flow meter reading (ultrasonic meters) for system input volume, the Project found out that data acquisition is not always available due to non-full flow of water at bulk flow meters in the previous monitoring, which results in difficulty in calculating/monitoring system input volume as well as NRW ratio of the whole water supply system.

#### **(2) Customers' Zonal and PMA Coding (Output-1)**

Customers' zonal and PMA coding is still ongoing (80% completed) as a fundamental condition for water distribution management and NRW monitoring, and FCTWB has faced in difficulty in identifying their locations.

#### **(3) Irregular Billing Cycle (Output-1)**

Same as the previous monitoring, from the fact that bills were issued at 6 times in the past 12 months, meter reading and billing has not been done in regular intervals, which causes difficulty in calculation/monitoring of billed water consumption.

#### **(4) Monitoring of NRW Ratio and/or related Data in Zone and PMA**

- a) System input volume to Zone 5 is not measurable for NRW monitoring.
- b) Also, system input volume to PMAs in Jabi and Garki I are not measurable or recordable for NRW monitoring.
- c) Prepaid meter payment record in Gudu PMA has not been submitted regularly from Metering Unit to NRW Unit.

### **2-2 Cause**

#### **(1) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)**

Based on the Project Team's preliminary investigation, FCTWB and FCDA identified

interference along trunk mains by water flow from new water treatment plants (Phases 3&4) to water flow from old plants (Phases 1&2) at the upstream side of bulk flow meters as a cause of non-full flow of water and also overflow from water treatment plants (Phases 3&4).

#### **(2) Customers' Zonal and PMA Coding (Output-1)**

Some customers lack address information in billing system database, so zonal coding has slowed down.

#### **(3) Irregular Billing Cycle (Output-1)**

The inability of regular billing is attributed to operational challenges such as dearth of billing paper and non-constant power supply which are caused by funding problem.

#### **(4) Monitoring of NRW Ratio and/or related Data in Zone and PMA**

- a) Solar panel for zonal meter located at roof-top of Tank 5 was stolen in February 2018.
- b) A mechanical meter in Jabi PMA is not functioning, and data from an ultrasonic PMA meter seems to have not been transferred to portable data logger in Garki I PMA.
- c) Existing prepaid meter software cannot create data sheets.

### **2-3 Action to be taken**

#### **(1) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)**

Since the previous monitoring, the Project estimated system input volume based on available and reliable data which the Project can obtain, and continue to do it.

As a result of discussions and close collaboration between FCDA and FCTWB about water flow interference at an injection point along a trunk main by water flow from new water treatment plant (Phases 3&4) to water flow from old plant (Phases 1&2) at the upstream side of bulk flow meters, FCDA started relocation works of the injection point from the upstream side to the downstream side in June 2018, and will complete it by the end of July 2018.

#### **(2) Customers' Zonal and PMA Coding (Output-1)**

Customers' address information should be clarified one by one and efficiently, then zonal and PMA coding should be completed by the second week of July 2018.

#### **(3) Irregular Billing Cycle (Output-1)**

Any possible measures and efforts are taken to ensure regular meter reading and billing. The issue should be escalated properly to not only management of FCTWB but also governing Board and FCTA to address importance of regular billing for improvement in calculation of billed water consumption, and to obtain their understanding and necessary funding.

#### **(4) Monitoring of NRW Ratio and/or related Data in Zone and PMA**

- a) The solar system should be recovered by utilizing spare panels from other solar systems by the end of July 2018, and those spare panels will be restocked later.
- b) A PMA mechanical meter in Jabi PMA should be replaced, and data transfer failure from an ultrasonic PMA meter to data logger in Garki PMA should be solved by the end of July 2018.
- c) Prepaid meter payment record in Gudu PMA should be submitted regularly from Metering Unit to NRW Unit by utilizing an alternative data source.

## **2-4 Roles of Responsible Persons/Organization**

### **[Nigerian Side]**

#### **(1) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)**

NRW Unit continues to estimate system input volume based on available and reliable data which the Project can obtain.

As soon as FCDA completes relocation works of the injection point from the upstream side to the downstream side by the end of July 2018, FCDA and FCTWB will work on cabling works, then FCTWB will monitor bulk and zonal flow meter reading (ultrasonic meters) for system input volume as originally designed.

#### **(2) Customers' Zonal and PMA Coding (Output-1)**

- Relevant Units such as MIS, billing, AMR and NRW as task team identify list of customers whom address information is unclear for zonal coding.
- By customer category, relevant Units such as major consumers and Area Office cooperate with task team for clarification of address information.
- Then, task team completes immediately zonal coding by clarified information as well as PMA coding based on pilot project customer list.

#### **(3) Irregular Billing Cycle (Output-1)**

NRW Unit and Billing Unit escalate the issue to management of FCTWB, then from FCTWB to Board members and FCTA to address importance of regular billing for improvement in calculation of billed water consumption, and to obtain their understanding and necessary budget allocation.

#### **(4) Monitoring of NRW Ratio and/or related Data in Zone and PMA**

- a) Both NRW Unit and Facility & Electro-Mechanical Unit work on solar panel installation and supervision.
- b) Process of procurement of a mechanical meter is ongoing. NRW Unit, Pipeline Unit and Area Office replace the mechanical PMA meter by new one in Jabi. NRW Unit and Facility & Electro-Mechanical Unit investigate situation of data transfer from ultrasonic PMA meter

logger in Garki I, then take necessary measures.

c) Metering Unit obtains prepaid meter payment record from Revenue Unit, then submit it in suitable format to NRW Unit monthly.

#### **[Japanese Side]**

##### **(1) Data Acquisition by Bulk and Zonal Flow Meters (Output-1)**

JICA Expert Team provides necessary supports to FCTWB, particularly NRW Unit to continue estimating system input volume based on available and reliable data which the Project can obtain, and provides necessary and possible assistance for relocation works of the injection point.

##### **(2) Customers' Zonal and PMA Coding (Output-1)**

JICA Expert Team provides necessary supports to FCTWB.

##### **(3) Irregular Billing Cycle (Output-1)**

JICA Expert Team provides necessary supports to FCTWB.

##### **(4) Monitoring of NRW Ratio and/or related Data in Zone and PMA**

JICA Expert Team provides necessary supports to FCTWB.

### **3 Modification of the Project Design Matrix and Project Implementation Plan**

#### **3-1 Project Design Matrix and Plan of Operation**

As a result of this monitoring, the Project Team confirmed process and suggests revision of PDM (PDM<sub>4</sub> to PDM<sub>5</sub>) as below, as well as Plan of Operation (PO<sub>4</sub> to PO<sub>5</sub>).

##### **(1) FCTA's Approval Process of the Medium-term Strategic Plan for NRW Reduction**

The draft medium-term strategic plan for NRW reduction (2019-2023) is submitted by FCTWB to FCTA for review and approval as the indicator "3a" for Output-3, and then the approval shall be done by the end of the Project as the indicator "a" for Project Purpose. For this approval process, the Nigerian side confirmed that governing board of FCTWB authorized by FCTA takes responsibility of the approval.

##### **(2) Incorporation of Annual NRW Reduction Plan (2019) to FCTWB's Annual Recurrent and Capital Budget Plan (2019)**

FCTWB prepares annual recurrent and capital budget plan in October in recent years, so annual NRW reduction plan (2019) is not likely to be incorporated to annual recurrent and capital budget plan by September 2018, the end of the Project.

The Nigerian side requested to modify the indicator 3b for Output-3 as below, as a revision of the present PDM<sub>4</sub>.

Before modification (PDM<sub>4</sub>): “3b. An annual NRW reduction plan (2019) is incorporated in FCWTB’s annual recurrent and capital plan (2019) for submission to FCTA for review and approval.”

After modification (PDM<sub>5</sub>): “3b. An annual NRW reduction plan (2019) is incorporated in FCWTB’s annual recurrent budget plan (2019) or committed on its incorporation by the General Manager of FCTWB for submission to FCTA for review and approval.”

### **3-2 Other modifications on detailed implementation plan**

None.

## **4 Preparation by Nigerian side toward after completion of the Project**

- Follow up for incorporation of the annual NRW reduction plan (2019) to FCTWB’s annual recurrent budget plan (2019)
- Follow up for modification of FCTWB’s budget templates
- Standing imprest either monthly or quarterly basis for routine activities
- Set up staffing, office and equipment storage
- Monitoring of NRW ratio and related data (the whole system, zones and PMAs)
- Preparatory survey on zones
- Regular reporting to Management and governing Board of FCTWB

## **II. Project Monitoring Sheet I & II (as attached)**

### **Annex**

Annex-1: Participants in Preparation of Project Monitoring Sheets and Photos

**Project Monitoring Sheet I (Revision of Project Design Matrix)**

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project

Project Period: October 2014 to September 2018

Implementing Organization: Federal Capital Territory Administration (FCTA) / Federal Capital Territory Water Board (FCTWB)

Direct Beneficiaries: FCTWB, relevant staff of FCTWB Headquarters and Pilot Area Offices

Project Site: FCT Pilot Area Offices: Jabi, Garki I and Gudu

Version 45

Dated 28 Jun. 2018

Monitoring: 27 Jun. 2018

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<p>&lt;Overall Goal&gt; Non-Revenue Water reduction activities are routinely implemented in the service area of FCTWB.</p>	<p>a. NRW reduction operations are carried out according to the medium-term strategic plan for NRW reduction (2019-2023).</p>	<p>a. Report of NRW reduction activities and monitoring by NRW Unit (NRW ratio, records of leakage detection, repair, disconnection of illegal connections, etc.)</p>	<p>A. Policy support for NRW reduction is not discontinued B. Natural disaster/ political instability/ economic crisis that affect the service area of FCTWB do not occur C. Activities to implement the medium-term strategic plan are not discontinued or delayed</p>	<p>Not yet.</p>	
<p>&lt;Project Purpose&gt; Capacity of FCTWB for NRW reduction is strengthened</p>	<p>a. The medium-term strategic plan for NRW reduction (2019-2023) is approved by FCTA by the end of the Project. b. Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level. c. NRW ratio of each PMA is monitored.</p>	<p>a. Date of approval of the plan b. Results of joint assessment based on the criteria set by the Project c. Record of NRW ratio kept by NRW Unit</p>	<p>A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers</p>	<p>Indicator a: Not yet. Indicator b: Follow-up capacity development have been done in Phase-2 of the Project. Indicator c: Partially monitored.</p>	
<p>&lt;Outputs&gt; 1. Level of NRW of both the service area of FOWTB and water distribution areas is monitored and estimated.</p>	<p>1a. Record of NRW ratio is kept by NRW Unit. 1b. NRW ratio of the service area of FCTWB is reported to its Joint Management Meeting. 1c. NRW ratio of the service area of FCTWB is reported to Management of FCTWB. 1d. Periodic records of data and estimation on water distribution management such as water flow of zonal meters and water pressure are kept by NRW Unit.</p>	<p>1a. Record of NRW ratio 1b&amp;1c. Material for meetings submitted by NRW Unit 1d. Periodic records of data on water distribution management</p>	<p>A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers</p>	<p>Indicator 1a&amp;1b&amp;1c: NRW ratio was estimated because of data deficiency at bulk meters and recorded/reported. Indicator 1d: Water flow has been recorded by zonal meters although data deficiency.</p>	
<p>2. Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices (*1)</p>	<p>2a. Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations. 2b. Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce.</p>	<p>2a. Record of NRW ratio kept by NRW Unit 2b. Date of approval of the manuals</p>	<p>A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers</p>	<p>Indicator 2a: Not successful in SMA-2 of Garki I due to difficulty in identifying the installed pipeline, but indicator was generally achieved in all three PMAs. Indicator 2b: Reviewed and updated. Approval process is ongoing.</p>	
<p>3. A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2 (*2)</p>	<p>3a. Draft medium-term strategic plan for NRW reduction (2019-2023) is submitted by FCTWB to FCTA for review and approval. 3b. An annual NRW reduction plan (2019) is committed by the governing Board of FCTWB, to be incorporated in FCTWB's annual recurrent and capital budget plan (2019) for submission to FCTA for review and approval. 3c. A planning manual for NRW reduction is approved by the Director General Manager of FCTWB. 3d. Framework of water distribution management is established.</p>	<p>3a&amp;3b. Date of official letter submitting draft strategic plan and annual-recurrent-and-capital-plan 3b. Date of commitment incorporating annual NRW reduction plan in annual recurrent and capital budget plan 3c. Date of approval of the manual 3d. Implementing structure and workflow of water distribution management</p>	<p>A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers</p>	<p>Indicator 3a&amp;3b&amp;3c: Not yet. Indicator 3d: Ongoing but delayed due to delay in Activity 1-7 and 3-9.</p>	

Note (\*1): NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection  
Note (\*2): A medium-term strategic plan is a five-year plan, which may include medium-term target, strategies and actions, timeframe, human resource requirement, on-the-job training mechanism, cost-benefit analysis of NRW reduction, etc. It is noted that NRW components addressed by the strategic plan are not limited to the ones mentioned in (\*1) above; they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

Activities	Inputs	The Nigerian Side	The Japanese Side	Important Assumption
<p>1-1 Install bulk meters to water treatment plants 1 and 2 1-2 Measure/estimate water production of water treatment plants 1, 2, 3 and 4 1-3 Tally the above water production data/estimation 1-4 Calculate the water consumption based on the billing data 1-5 Calculate NRW ratio of the service area of FCTWB using the results obtained from Activity 1-3 and 1-4 1-6 Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system 1-7 Measure/estimate and collect data for water distribution management such as water flow of zonal meters and water pressure 2-1 Review existing NRW reduction operations at each pilot Area Office 2-2 Conduct capacity assessment of the relevant staff of each pilot Area Office 2-3 Identify and select a Pilot Metering Area (PMA) for each pilot Area Office based on the selection criteria of PMA (*3) 2-4 Prepare/update distribution network drawings for each PMA 2-5 Install water flow meters to each PMA and measure in/outflows monthly 2-6 Zone each PMA into Sub Metering Areas (SMA) 2-7 Isolate a SMA by installing valves 2-8 Update the distribution network drawings for each SMA 2-9 Measure an initial level of NRW of each SMA 2-10 Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA 2-11 Develop a NRW reduction operation plan of each SMA including reduction target, for review by Head of Distribution Department 2-12 Review and approve NRW reduction operation plan of each SMA 2-13 Implement the NRW reduction operations at each SMA 2-14 Monitor the progress of the NRW reduction operations of each SMA 2-15 Measure level of NRW of each SMA at the end of the respective operations 2-16 Prepare a report on pilot projects, covering Activity 2-1~2-15 2-17 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials</p>	<p><b>Project Personnel</b> 1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA 2. Project Manager: <b>Director, General Manager</b> of FCTWB 3. Deputy Project Manager: HoD for Administration and Supply/FCTWB 4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce/FCTWB 5. Members of NRW Management Team (FCTWB): - Head of Special Project Unit of Distribution Department (as Coordinator) - Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department 6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS) 7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office 8. Other personnel mutually agreed upon as necessary</p> <p><b>Land, Building and Facilities (to be financed by Couterpart Fund)</b> 1. Office building and facilities necessary for the implementation of the Project 2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each pilot Area Office, including internet connection and air conditioners 3. Chambers for flow meters and valves for the selected PMAs/SMAs 4. Electric wiring to bulk/zonal meters, loggers and pressure sensors. 5. Other facilities mutually agreed upon as necessary</p> <p><b>Local Costs (to be financed by Couterpart Fund)</b> 1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs 2. Administration and operational costs, including cost for local travel for the Project Personnel, demurrage at local customs point, licensing cost of radio application and cost for communication of telemetric device for selected zonal meter(s) and water pressure sensor(s) 3. Other costs mutually agreed upon as necessary</p>	<p><b>The Nigerian Side</b> <b>Japanese Experts</b> 1. Chief Advisor / NRW Reduction Planning / Water Distribution Management 1 2. Deputy Chief Advisor / NRW Reduction Planning 3. NRW Reduction Operations Management 4. Leakage Detection Technology 5. Commercial Loss 6. Hydraulic Analysis / GIS 7. Procurement Manage't / Coordination 8. Facility Design / Construction Supervision 9. Equipment Design / Installation 10. Water Distribution Management 2 11. Remote Monitoring Device Installation / Training 13. Financial Analysis / Organization 14. Other experts mutually agreed upon as necessary <b>Equipment</b> 1. Bulk meters and loggers for water treatment plants 2. Water flow meters, valves, and customer meters for SMA 3. Leakage detection equipment for PMA 4. Pipe repair equipment for PMA 5. Vehicles (Pick-ups) 6. Generator for project office 7. Zonal meters, loggers and water pressure sensors 8. Telemetric monitoring system for selected zonal meters 9. Solar powering systems for zonal meters 10. Other equipment mutually agreed upon as necessary</p> <p><b>Facilities</b> 1. Modification of existing billing system 2. Chambers for bulk meters for water treatment plants and zonal meters</p> <p><b>Training of the Nigerian Project Personnel</b> 1. Eighteen persons mutually agreed upon will be trained in Japan. 2. GIS training in Nigeria</p>	<p><b>Pre-Conditions</b> A. Furnished offices for Japanese Experts are secured at the Headquarters and each Pilot Area Office of FCTWB. B. Project Personnel is assigned with the finalized list.</p>	<p>A. Natural disaster / political / instability / economic crisis that affect the Project activities do not occur.</p>
<p>3-1 Establish a Working Group for NRW planning (*4) 3-2 Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB 3-3 Conduct hydraulic and water pressure distribution analyses of the pipeline networks 3-4 Develop outlines of the medium-term strategic plan and its annual NRW reduction plan 3-5 Develop the first medium-term strategic plan (2019-2023) for approval by FCTA 3-6 Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA 3-7 Develop a planning manual for NRW reduction 3-8 Review existing plans, activities and implementing structure, etc. related to water distribution management 3-9 Establish framework of water distribution management</p>	<p><b>Local Costs (to be financed by Couterpart Fund)</b> 1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs 2. Administration and operational costs, including cost for local travel for the Project Personnel, demurrage at local customs point, licensing cost of radio application and cost for communication of telemetric device for selected zonal meter(s) and water pressure sensor(s) 3. Other costs mutually agreed upon as necessary</p>	<p><b>The Nigerian Side</b> <b>Japanese Experts</b> 1. Chief Advisor / NRW Reduction Planning / Water Distribution Management 1 2. Deputy Chief Advisor / NRW Reduction Planning 3. NRW Reduction Operations Management 4. Leakage Detection Technology 5. Commercial Loss 6. Hydraulic Analysis / GIS 7. Procurement Manage't / Coordination 8. Facility Design / Construction Supervision 9. Equipment Design / Installation 10. Water Distribution Management 2 11. Remote Monitoring Device Installation / Training 13. Financial Analysis / Organization 14. Other experts mutually agreed upon as necessary <b>Equipment</b> 1. Bulk meters and loggers for water treatment plants 2. Water flow meters, valves, and customer meters for SMA 3. Leakage detection equipment for PMA 4. Pipe repair equipment for PMA 5. Vehicles (Pick-ups) 6. Generator for project office 7. Zonal meters, loggers and water pressure sensors 8. Telemetric monitoring system for selected zonal meters 9. Solar powering systems for zonal meters 10. Other equipment mutually agreed upon as necessary</p> <p><b>Facilities</b> 1. Modification of existing billing system 2. Chambers for bulk meters for water treatment plants and zonal meters</p> <p><b>Training of the Nigerian Project Personnel</b> 1. Eighteen persons mutually agreed upon will be trained in Japan. 2. GIS training in Nigeria</p>	<p><b>Pre-Conditions</b> A. Furnished offices for Japanese Experts are secured at the Headquarters and each Pilot Area Office of FCTWB. B. Project Personnel is assigned with the finalized list.</p>	<p>A. Natural disaster / political / instability / economic crisis that affect the Project activities do not occur.</p>
<p>4-1 Data Acquisition by Bulk and Zonal Flow Meters (Output-1) Issue: Data acquisition is not always available due to non-full flow of water at bulk flow meters. The Nigerian side identified interference along trunk mains by water flow as a cause of non-full flow of water and also overflow from plants. Countermeasures: FCDA started relocation works of the injection point in June 2018, and will complete it by the end of July 2018. 2) Customers' Zonal and PMA Coding (Output-1) Issue: Customers' zonal and PMA coding is still ongoing and FCTWB has faced in difficulty in identifying their locations. Some customers lack address information in billing system database, so coding has slowed down. Countermeasures: Customers' address information should clarified one by one and efficiently, then coding should be completed by the second week of July 2018. 3) Irregular Billing Cycle (Output-1) Issue: Meter reading and billing has not been done in regular intervals. The inability is attributed to operational challenges such as dearth of billing paper and non-constant power supply which are caused by funding problem. Countermeasures: The issue is escalated properly to not only management of FCTWB but also governing Board and FCTA to address importance, and to obtain their understanding and necessary funding. 4) Monitoring of NRW Ratio and/or related Data in Zone and PMA Issue: a) System input volume to Zone 5 is not measurable because of solar panel stolen. b) System input volume to PMAs in Jabi and Garki 1 are not measurable or recordable because of meter or data transfer failure. c) Prepaid meter payment record in Gudu PMA has not been submitted regularly from Metering Unit to NRW Unit. Countermeasures: a) Solar system should be recovered by the end of July 2018. b) The meter in Jabi PMA should be replaced, and data transfer failure in Garki PMA should be solved by the end of July 2018. c) Prepaid meter payment record in Gudu PMA should be submitted regularly by utilizing an alternative data sources.</p>	<p><b>Local Costs (to be financed by Couterpart Fund)</b> 1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs 2. Administration and operational costs, including cost for local travel for the Project Personnel, demurrage at local customs point, licensing cost of radio application and cost for communication of telemetric device for selected zonal meter(s) and water pressure sensor(s) 3. Other costs mutually agreed upon as necessary</p>	<p><b>The Nigerian Side</b> <b>Japanese Experts</b> 1. Chief Advisor / NRW Reduction Planning / Water Distribution Management 1 2. Deputy Chief Advisor / NRW Reduction Planning 3. NRW Reduction Operations Management 4. Leakage Detection Technology 5. Commercial Loss 6. Hydraulic Analysis / GIS 7. Procurement Manage't / Coordination 8. Facility Design / Construction Supervision 9. Equipment Design / Installation 10. Water Distribution Management 2 11. Remote Monitoring Device Installation / Training 13. Financial Analysis / Organization 14. Other experts mutually agreed upon as necessary <b>Equipment</b> 1. Bulk meters and loggers for water treatment plants 2. Water flow meters, valves, and customer meters for SMA 3. Leakage detection equipment for PMA 4. Pipe repair equipment for PMA 5. Vehicles (Pick-ups) 6. Generator for project office 7. Zonal meters, loggers and water pressure sensors 8. Telemetric monitoring system for selected zonal meters 9. Solar powering systems for zonal meters 10. Other equipment mutually agreed upon as necessary</p> <p><b>Facilities</b> 1. Modification of existing billing system 2. Chambers for bulk meters for water treatment plants and zonal meters</p> <p><b>Training of the Nigerian Project Personnel</b> 1. Eighteen persons mutually agreed upon will be trained in Japan. 2. GIS training in Nigeria</p>	<p><b>Pre-Conditions</b> A. Furnished offices for Japanese Experts are secured at the Headquarters and each Pilot Area Office of FCTWB. B. Project Personnel is assigned with the finalized list.</p>	<p>A. Natural disaster / political / instability / economic crisis that affect the Project activities do not occur.</p>
<p>Issues &amp; Countermeasures</p>				

Note (\*3) Selection criteria of PMA are as follows: (i) Safety for night works is secured in measuring minimum night flow; (ii) Distribution network is separated and it is easy to isolate it in measuring NRW ratio; and (iii) NRW ratio is supposedly high.  
Note (\*4) Working Group for NRW planning would consist of Project Manager (as chair), Deputy Project Manager, Technical Managers, Head of Finance Dept., Head of Production Dept., Head of PRS Unit, and members of NRW Management Team.



Project Monitoring Sheet II (Plan of Operations)

Plan of Schedule and Actual Work Done

Activities	2011												Remarks	Achievement	Monitoring	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
1.1. Project Kick-off meeting															Completed	March 8
1.2. Develop business case															Completed	February 2011
1.3. Develop project plan															Completed	February 2011
1.4. Obtain approval for project															Completed	February 2011
1.5. Set up project management office															Completed	February 2011
1.6. Establish governance															Completed	February 2011
1.7. Develop risk management plan															Completed	February 2011
1.8. Develop stakeholder management plan															Completed	February 2011
1.9. Develop communication plan															Completed	February 2011
1.10. Develop quality management plan															Completed	February 2011
1.11. Develop change management plan															Completed	February 2011
1.12. Develop procurement management plan															Completed	February 2011
1.13. Develop resource management plan															Completed	February 2011
1.14. Develop budget															Completed	February 2011
1.15. Develop risk register															Completed	February 2011
1.16. Develop stakeholder register															Completed	February 2011
1.17. Develop communication matrix															Completed	February 2011
1.18. Develop quality standards															Completed	February 2011
1.19. Develop change management strategy															Completed	February 2011
1.20. Develop procurement strategy															Completed	February 2011
1.21. Develop resource strategy															Completed	February 2011
1.22. Develop budget strategy															Completed	February 2011
1.23. Develop risk strategy															Completed	February 2011
1.24. Develop stakeholder strategy															Completed	February 2011
1.25. Develop communication strategy															Completed	February 2011
1.26. Develop quality strategy															Completed	February 2011
1.27. Develop change strategy															Completed	February 2011
1.28. Develop procurement strategy															Completed	February 2011
1.29. Develop resource strategy															Completed	February 2011
1.30. Develop budget strategy															Completed	February 2011
1.31. Develop risk strategy															Completed	February 2011
1.32. Develop stakeholder strategy															Completed	February 2011
1.33. Develop communication strategy															Completed	February 2011
1.34. Develop quality strategy															Completed	February 2011
1.35. Develop change strategy															Completed	February 2011
1.36. Develop procurement strategy															Completed	February 2011
1.37. Develop resource strategy															Completed	February 2011
1.38. Develop budget strategy															Completed	February 2011
1.39. Develop risk strategy															Completed	February 2011
1.40. Develop stakeholder strategy															Completed	February 2011
1.41. Develop communication strategy															Completed	February 2011
1.42. Develop quality strategy															Completed	February 2011
1.43. Develop change strategy															Completed	February 2011
1.44. Develop procurement strategy															Completed	February 2011
1.45. Develop resource strategy															Completed	February 2011
1.46. Develop budget strategy															Completed	February 2011
1.47. Develop risk strategy															Completed	February 2011
1.48. Develop stakeholder strategy															Completed	February 2011
1.49. Develop communication strategy															Completed	February 2011
1.50. Develop quality strategy															Completed	February 2011
1.51. Develop change strategy															Completed	February 2011
1.52. Develop procurement strategy															Completed	February 2011
1.53. Develop resource strategy															Completed	February 2011
1.54. Develop budget strategy															Completed	February 2011
1.55. Develop risk strategy															Completed	February 2011
1.56. Develop stakeholder strategy															Completed	February 2011
1.57. Develop communication strategy															Completed	February 2011
1.58. Develop quality strategy															Completed	February 2011
1.59. Develop change strategy															Completed	February 2011
1.60. Develop procurement strategy															Completed	February 2011
1.61. Develop resource strategy															Completed	February 2011
1.62. Develop budget strategy															Completed	February 2011
1.63. Develop risk strategy															Completed	February 2011
1.64. Develop stakeholder strategy															Completed	February 2011
1.65. Develop communication strategy															Completed	February 2011
1.66. Develop quality strategy															Completed	February 2011
1.67. Develop change strategy															Completed	February 2011
1.68. Develop procurement strategy															Completed	February 2011
1.69. Develop resource strategy															Completed	February 2011
1.70. Develop budget strategy															Completed	February 2011
1.71. Develop risk strategy															Completed	February 2011
1.72. Develop stakeholder strategy															Completed	February 2011
1.73. Develop communication strategy															Completed	February 2011
1.74. Develop quality strategy															Completed	February 2011
1.75. Develop change strategy															Completed	February 2011
1.76. Develop procurement strategy															Completed	February 2011
1.77. Develop resource strategy															Completed	February 2011
1.78. Develop budget strategy															Completed	February 2011
1.79. Develop risk strategy															Completed	February 2011
1.80. Develop stakeholder strategy															Completed	February 2011
1.81. Develop communication strategy															Completed	February 2011
1.82. Develop quality strategy															Completed	February 2011
1.83. Develop change strategy															Completed	February 2011
1.84. Develop procurement strategy															Completed	February 2011
1.85. Develop resource strategy															Completed	February 2011
1.86. Develop budget strategy															Completed	February 2011
1.87. Develop risk strategy															Completed	February 2011
1.88. Develop stakeholder strategy															Completed	February 2011
1.89. Develop communication strategy															Completed	February 2011
1.90. Develop quality strategy															Completed	February 2011
1.91. Develop change strategy															Completed	February 2011
1.92. Develop procurement strategy															Completed	February 2011
1.93. Develop resource strategy															Completed	February 2011
1.94. Develop budget strategy															Completed	February 2011
1.95. Develop risk strategy															Completed	February 2011
1.96. Develop stakeholder strategy															Completed	February 2011
1.97. Develop communication strategy															Completed	February 2011
1.98. Develop quality strategy															Completed	February 2011
1.99. Develop change strategy															Completed	February 2011
1.100. Develop procurement strategy															Completed	February 2011

Project Monitoring Sheet II (Plan of Operations)  
Plan of Schedule and Actual Work Period

PM Form 3-3 Project Monitoring Sheet II  
Version: 4  
Date: 10/26/2011  
Monitoring 27 Jul 2011

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project

Activity ID	Activity Name	Start	End	Actual Start	Actual End	Progress %	Remarks
1.0	Project Kick-off	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.1	Establish a steering committee	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.2	Develop a project charter	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.3	Develop a project management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.4	Develop a communication management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.5	Develop a risk management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.6	Develop a stakeholder management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.7	Develop a procurement management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.8	Develop a quality management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.9	Develop a resource management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.10	Develop a change management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.11	Develop a project closure plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.12	Develop a project monitoring and reporting system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.13	Develop a project communication system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.14	Develop a project risk management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.15	Develop a project stakeholder management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.16	Develop a project procurement management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.17	Develop a project quality management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.18	Develop a project resource management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.19	Develop a project change management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
1.20	Develop a project closure management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed

Activity ID	Activity Name	Start	End	Actual Start	Actual End	Progress %	Remarks
2.0	Project Kick-off	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.1	Establish a steering committee	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.2	Develop a project charter	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.3	Develop a project management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.4	Develop a communication management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.5	Develop a risk management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.6	Develop a stakeholder management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.7	Develop a procurement management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.8	Develop a quality management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.9	Develop a resource management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.10	Develop a change management plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.11	Develop a project closure plan	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.12	Develop a project monitoring and reporting system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.13	Develop a project communication system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.14	Develop a project risk management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.15	Develop a project stakeholder management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.16	Develop a project procurement management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.17	Develop a project quality management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.18	Develop a project resource management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.19	Develop a project change management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed
2.20	Develop a project closure management system	2011-07-01	2011-07-01	2011-07-01	2011-07-01	100%	Completed

# Project Monitoring Sheet II (Plan of Operations)

Plan of Schedule and Actual Work Period

PO1  
Version: 4  
Date:   
Monitoring 27 Aug 2018

Project Title: The Federal Capital Territory Reduction of the Revenue Water Project																	
Activity / Milestone / Task	Start	End	Duration	2018												Remarks	Notes
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
<b>1. Project Preparation and Approval</b>																	
1.1. Obtain necessary permits and approvals	1	3	3														
1.2. Develop project charter and stakeholder register	1	3	3														
1.3. Establish communication and reporting structure	1	3	3														
<b>2. Data Collection and Analysis</b>																	
2.1. Collect and analyze project performance data	4	30	27														
2.2. Identify root causes and dependencies	4	30	27														
<b>3. Development of the Plan of Operations</b>																	
3.1. Develop project plan (Schedule, Budget, Risk, etc.)	4	30	27														
3.2. Obtain stakeholder approval for the plan	4	30	27														
<b>4. Implementation and Monitoring</b>																	
4.1. Implement project activities	4	30	27														
4.2. Monitor project performance and report	4	30	27														
<b>5. Reporting and Review</b>																	
5.1. Prepare project status reports	4	30	27														
5.2. Review project performance and make adjustments	4	30	27														

## Participants in Preparation of Draft Monitoring Sheets

### Day 1: 20<sup>st</sup> June 2018 for Draft Project Monitoring Sheets

S/N	NAME	POSITION
1	Nahucho A.A	General Manager (Project Manager)
2	Aliyu Ahmad Usuman	Asst. Director
3	Lawal Abolade R.	Head [Special Projects] (Coordinator)
4	Dikko Musa	Head [PL/WC]
5	Adeyemi A. Taiwo	H.O.D Commerce
6	Rabiu M.Kabir	Head [NRW]
7	Fabikun Adedeji Kehinde	Head [MIS]
8	Shehu Suleiman	Head [GIS]
9	Abdullahi Masaud	Area Manager Gwarinpa
10	Abubakar Ubale	S.E Civil
11	Igbinosa Courage	NRW
12	Abdulrahman Shehu Sani	Head Metering
13	Muhammed Dauda	Pipeline Unit
14	Sulaiman A Muhammed	Area Manager Jabi
15	Abdul Ozumi	AAM[Dist.] Gudu
16	Mohammed E Gana	AAM[Dist.] Garki I
17	Izegaegbe A. Ayo	AAM[Com.] Garki I
18	Bashir Adamu	AAM[Com.] Gudu
19	Abdul Yusuf	Superintendent, Gudu
20	Ezeh Hillary	Surveyor/ GIS
21	Abubakar Danladi	Senior Foreman
22	Titus Dawan	Commerce, Garki I
23	Ibrahim Yauri	Senior Foreman
24	Akinori Miyoshi	CA, JICA Expert Team

### Day 2: 27<sup>th</sup> June 2018 for Draft Project Monitoring Sheets

S/N	NAME	POSITION
1	Nahucho A.A	General Manager (Project Manager)
2	Aliyu Ahmad Usuman	Asst. Director
3	Lawal Abolade R.	Head [Special Projects] (Coordinator)
4	Pheobe Ocheja	HOD [Admin&Supply]
5	Hasfat Ahmed Lawi	HOD [Finance and Account]
6	Lola Okobi	HOD [Quality Control]
7	Dikko Musa	Head [PL/WC]
8	Bamidele Olatunji	Head [International Cooperation]
9	Rabiu M.Kabir	Head [NRW]
10	Fabikun Adedeji Kehinde	Head [MIS]
11	Shehu Suleiman	Head [GIS]
12	Abdullahi Masaud	Area Manager Gwarinpa
13	Abubakar Ubale	S.E Civil
14	Abdulrahman Shehu Sani	Head [Metering]
15	Rose Akpan	Head [Billing]
16	Yahaya O. Kuike	Head [Audit]
17	Dada	Commerce
18	Abdulrahman Mohammed	NRW
19	Akinori Miyoshi	CA, JICA Expert Team

### Photos of Preparation of Monitoring Sheet

	<p><b>Day 1: 20<sup>th</sup> June 2018</b></p> <p>Information sharing and discussion about project progress</p> <p>(Attendance: NRW Management Team members and Action Team Members)</p>
	<p><b>Day 2: 27<sup>th</sup> June 2018</b></p> <p>Preparation of Draft Project Monitoring Sheets</p> <p>(Attendance: Project Manager, Deputy Project Manager, NRW Management Team members and FCTWB Management)</p>

