Department of Water and Sanitation (DWS)
Infrastructure Branch Training Centre (IBTC, DWS)
South African Local Government Association (SALGA)

PROJECT FOR STRENGTHENING THE TRAINING CAPACITY OF IBTC ON NON-REVENUE WATER IN REPUBLIC OF SOUTH AFRICA

PROJECT FINAL REPORT (MAIN REPORT)

June 2021

Japan International Cooperation Agency
Yachiyo Engineering Co., Ltd.
Yokohama Water Co., Ltd.

GE
JR
21 – 022

Department of Water and Sanitation (DWS)
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Exchange Rate applied in this Report

As of June 2021

USD 1.00 = JPY 109.811

ZAR 1.00 = JPY 8.0002

(Source: JICA Official Website)

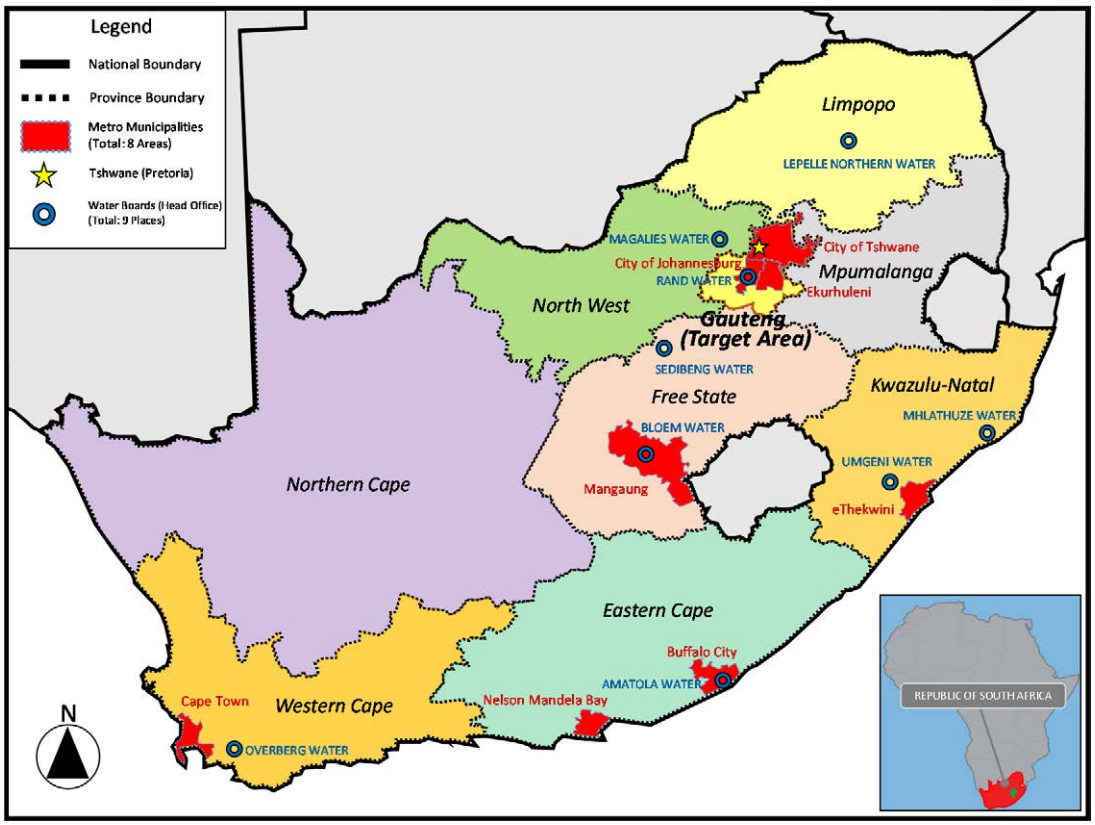


Figure 1: South Africa's Political Map and Project Target Area Location Map

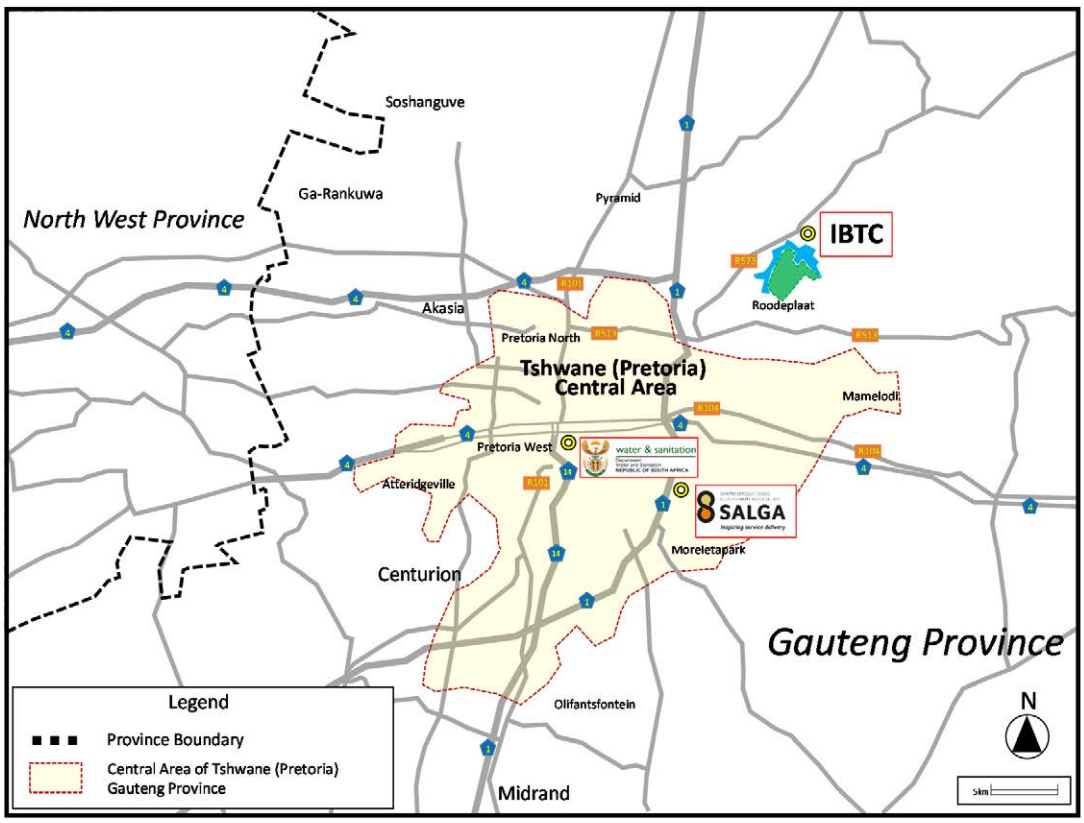


Figure 2: Location Map of Implementing Organization

Table 1: Project Design Matrix (PDM_3) (1/2)

Project Monitoring Sheet I (Revision of Project Design Matrix)

PDM_3

Project Title: Project for Strengthening the Training Capacity of IBTC on Non-Revenue Water in Republic of South Africa
Project Period: August 2017 to March 2021 (44 months)
Implementing Organization: Department of Water and Sanitation (DWS) / IBTC, South African Local Government Association (SALGA)
Direct Beneficiaries: DWS, IBTC and its personnel, Facilitators selected
Indirect Beneficiaries: Municipalities
End Beneficiaries: Customers / Consumers of water supplied by Municipalities
Project Site: Gauteng Province and all other Provinces

Version 3
Dated 17-Jul-20

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal					
Non-Revenue Water (NRW) management skills are utilized in participating municipalities under the established National NRW Training system.	1. No. of confirmed DMAs in participating municipalities is increased. 2. Any actions in NRW-related aspects are initiated in participating municipalities. 3. No. of the National NRW Trainings conducted with facilitators is increased as scheduled in annual programme (at least, three times a year). 4. No. of Business plan, SOP, teaching/ learning materials are revised periodically (at least, biennially). 5. Participating municipalities are monitored and followed up regularly. 6. Steering committee meeting is held regularly (at least, annually).	1&2. Monitoring/follow-up results of participating municipalities 3&4. IBTC's training reports 5. Monitoring/follow-up results of participating municipalities 6. Minutes of meeting of steering committee			
Project Purpose					
NRW management skills are developed for participating municipalities through the National NRW Training by IBTC.	1. No. of the National NRW Training is increased (three times or more). 2. No. of pilot DMAs for problem solution is increased (11 or more). 3. No. of facilitators is increased (adequate resources to conduct the Training: 16 or more). 4. No. of learners is increased (44 or more from 11 participating municipalities and others). 5. No. of debrief reports as outcomes are prepared (11 or more). 6. Learners' satisfaction scales are kept high or increased. 7. Steering committee's kick-off meeting is held. 8. Business plan, SOP, teaching/learning materials, committee TOR are finalized as Version-1.	All. IBTC's training reports All. Other relevant documents	- Dramatic reduction of budget and public grants on skills development for Municipalities does not happen.	1. Trainings were conducted three times: physically the 1st and 2nd groups/intakes in 2019 and 2020, and online the 3rd group/intake in 2020. 2. 7 participating municipalities of 1st and 2nd groups/intakes established pilot DMAs as workplaces, but 3rd group/intake didn't do it due to suspension of the workplace component by COVID-19 pandemic. 3. More than 16 facilitators from municipalities and DWS have engaged. 4. More than 50 learners from 10 municipalities and DWS regions participated. 5. 7 participating municipalities of the 1st and 2nd groups/intakes prepared debrief presentations. 6. All three trainings for the 1st, 2nd and 3rd groups/intakes were evaluated at high rate respectively by learners. 7. The steering committee's interim meeting was held in March 2021. 8. Business plan, SOPs, teaching/learning materials, committee TOR were finalized.	
Outputs					
1. Skill development, status-quo and challenges of NRW, and needs in municipalities are analyzed and shared with stakeholders.	1-1. Analyzed/organized information of skills development of municipalities is submitted to DWS (list of no. of staff, attended training, mentor resources, training providers, manuals, workshops and yards, subsidies/grants, good practices, etc.) 1-2. Analyzed/organized information of NRW and needs of municipalities is submitted to DWS. 1-3. Benchmarked matrix of Japan and South Africa on water services is submitted to DWS (comparative feature strength/weakness, methodology, etc.) 1-4. Information sharing occasions are provided.	1-1&2. Baseline survey report and training curriculum 1-3. Benchmark report 1-4. Seminar report and presentations		1-2&2. Information was compiled as a baseline survey report. 1-3a. A benchmark report was prepared by delegation officials in the 1st training in Japan and submitted to the DWS management. 1-3b. A benchmark report was prepared by delegation officials in the 2nd training in Japan and presented in the 2nd facilitator technical meeting. 1-4. Information of the Project including the National NRW Training, its concepts and efforts/challenges in water supply sector of both countries was shared with stakeholders through occasions such as physical/online meetings, forums, workshops, seminars, websites and media.	
2. IBTC's National NRW Training capacity is improved.	2-1. Appropriate organizational structure for the National NRW Training is established at IBTC. 2-2. No. of revision of Standard Operation Procedures (SOPs) of the National NRW Training is increased. 2-3. No. of revision of the National NRW Training Business Plan is increased. 2-4. Sustainability plans including steering committee or equivalent for the National NRW Training are finalized.	2-1. Capacity assessment report and/or organogram of IBTC (including IT environment) 2-2. Standard Operation Procedures (SOPs) of the National NRW Training 2-3. The National NRW Training Business Plan 2-4. Next year's annual programme, TOR of steering committee or equivalent, etc.		2-1. Organizational structure for the National NRW Training was established in collaboration with facilitators. 2-2. SOPs were developed and reviewed as a training package. 2-3. The Business Plan was prepared and reviewed in accordance with TOR of the steering committee of the National NRW Training (as a part of sustainability plan). 2-4. A sustainability plan for the National NRW Training for the next 3 years was developed (continuously be revised), and interim steering committee meeting was held in March 2021.	
3. The National NRW Training is conducted with training improvement cycle.	3-1. No. of Facilitator Technical Meeting is increased. (both physical and online basis) 3-2. No. of the National NRW Training is increased. (both physical and online basis) 3-3. Learners' satisfaction scales are kept high or increased. 3-4. Feedback/utilization of skills, knowledge and outcomes into water services of participating municipalities is increased.	3-1&2. IBTC's reports 3-3. Training evaluation questionnaire 3-4. Debriefing reports by learners and/or monitoring/follow-up results		3-1. The meetings were conducted physically twice in 2019 and online twice in 2020. 3-2. The trainings were conducted three times: physically the 1st and 2nd groups/intakes in 2019 and 2020, and online the 3rd group/intake in 2020. 3-3. All three trainings for the 1st, 2nd and 3rd groups/intakes were evaluated at high rate respectively by learners. 3-4. As a built-in outcome of the training, skills and knowledge trained were utilized practically into the workplace component and reflected into pilot results presentations.	

Note: Optionally-set Super Goal : NRW ratios decrease in participating municipalities utilizing the NRW management skills obtained from the National NRW Training. Objectively Verifiable Indicators : NRW ratios of participating municipalities are decreased. Means of Verification : No-Drop reports or reports from participating municipalities, and/or monitoring/follow-up report.
NRW management skills includes skills and knowledge about NRW and reticulation basics as well as the created outcomes.

Table 1: Project Design Matrix (PDM_3) (2/2)

Activities	Inputs		Important Assumption	Remarks
Activities for Output 1 1-1. Conduct baseline survey on skills development and NRW in municipalities. 1-2. Compile and analyze skills development and NRW in municipalities. 1-3. Review needs of skills development on NRW, existing qualifications, roles and responsibility of DWS/IBTC. 1-4. Benchmark water supply services and its skills development in Japan. 1-5. Hold a seminar and share on the results of the baseline survey and benchmark with stakeholders.	**The South African Side** **1. Project Personnel** 1) JCC Chairperson: Chief Director: Global Cooperation, IWS, DWS 2) JCC Chairperson-Alternate (PMC Chairperson): Chief Director: Engineering Services, IBOM, DWS 3) Project Director: Director: Technical Engineering Services, IBOM, DWS 4) Co-Project Director: Head: Technology and Innovative Projects, SALGA 5) Project Manager (Operational): Centre Manager: IBTC, DWS 6) Co-Project Manager (Technical): Director: Water Use Efficiency, P&I, DWS 7) Director: ODA, IWS, DWS 8) Director: Operational Support, PMU, DWS Other members such as 9) Training Manager, IBTC 10) Quality Assurer, IBTC 11) Officials from IBTC, WUE, Construction, Operational Support, ODA and Provincial offices 12) Municipal Coordinator (Technical), SALGA 13) Municipal Coordinator (HRD), SALGA 14) Facilitators 15) Secretary 16) Other personnel mutually agreed upon as necessary	**The Japanese Side** **1. JICA Experts** 1) Chief Advisor / NRW Management 2) Deputy Chief Advisor / NRW Management 3) Training Planning / Organization Coordination 4) Water Leakage Detection 5) Water Distribution Control / Commercial Loss 6) Training Yard Design and Supervision 7) Procurement / Administrative Coordination 8) Training Management / Human Resources Development 9) Other Expert(s) if necessary		
Activities for Output 2 2-1. Prepare the National NRW Training Business Plan. 2-2. Prepare and take procedures for funding the National NRW Training. 2-3. Prepare Terms of Reference for the National NRW Training. 2-4. Prepare Standard Operation Procedures (SOPs) of the National NRW Training. 2-5. Revise the SOP of the National NRW Training through the activities of Output-3. 2-6. Revise the National NRW Training Business Plan through the activities of Output-3. 2-7. Conduct capacity assessment of IBTC. 2-8: Review and enhance IT environment for online system adaptation in accordance with the activities of Output-3. 2-9: Develop sustainability plans for the National NRW Training.			**Pre-Conditions** - DWS and SALGA agree on their collaboration and cooperation for the Project - DWS allocates/ assigns personnel in charge of NRW Skills Programme at IBTC.	
Activities for Output 3 3-1. Design the National NRW Training based on the results of Output-1. 3-2. Secure the participating municipalities and site~~(s)~~ for workplace of the National NRW Training. 3-3. Secure facilitators (experienced/skilled personnel on water reticulation or equivalent) for the National NRW Training from DWS/IBTC and stakeholders. 3-4. Develop training yard for the National NRW Training at IBTC. 3-5. Procure equipment, instruments/tools and materials for the National NRW Training. 3-6. Develop teaching/learning materials for the National NRW Training with incorporating good practices from baseline survey into the materials if any. 3-7. Prepare and conduct Facilitator Technical Meetings by both facilitators and JICA Experts for the National NRW Training. 3-8. Prepare for conducting the National NRW Training (schedule, budget plan, applying for releasing fund, recruiting participants and etc.). 3-9. Conduct the National NRW Training by facilitators with support from JICA Experts. 3-10. Monitor the National NRW Training and feed the results back under training improvement cycle. 3-11. Verify effects of the National NRW Training in sampled municipalities. 3-12. Assess the feasibility and sustainability of online system adaptation into the National NRW Training. 3-13. Review, revise or upgrade the programme / curriculum, and develop new form and ways of the National NRW Training with online system adaptation. 3-14. Review, revise or upgrade learning / teaching materials and tools for online system adaptation. 3-15. Procure additional services, equipment, instruments / tools and materials for online system adaptation.	**2. Land, Building and Facilities** 1) Office space and facilities for JICA Experts, including water, electricity, internet connection and air conditioners if necessary 2) Land for training yard 3) Other facilities mutually agreed upon as necessary **3. Local Cost** 1) Allowance, accommodation, travelling cost and foods for project personnel, facilitators and trainees in South Africa (born by DWS, municipalities, etc.) 2) Administration and operational costs including cost for demurrage at local customs point and licensing of equipment/instruments if necessary 3) Other costs mutually agreed upon as necessary	**2. Facilities** 1) Training yard 2) Web site development and maintenance 3) Other facilities mutually agreed upon as necessary (e.g. for online system adaptation) **3. Equipment, instruments, tools and materials** 1) Bulk water flow meter 2) Leak detection equipment/instruments 3) Tools for training 4) Materials such as pipe, fittings, valve, meter and etc. 5) Other equipment, instruments, tools and materials mutually agreed upon as necessary (e.g. for online system adaptation) **4. Training** 1) Training in Japan 2) Training in the third country if necessary	**Issues & Countermeasures**	

Note: Indicators were discussed and finalized based on the baseline survey and were agreed at Joint Coordinating Committee (JCC). As an all-inclusive term, "Facilitator" in the Project may act as facilitator, trainer, mentor, coach and supervisor.

Table 2: Plan of Operation (PO_6) (1/3)

Project Monitoring Sheet II (Revision of Plan of Operation) **PO6**

Version 6
Dated 17-Jul-20

Project Title: Project for Strengthening the Training Capacity of IBTC on Non-Revenue Water in Republic of South Africa

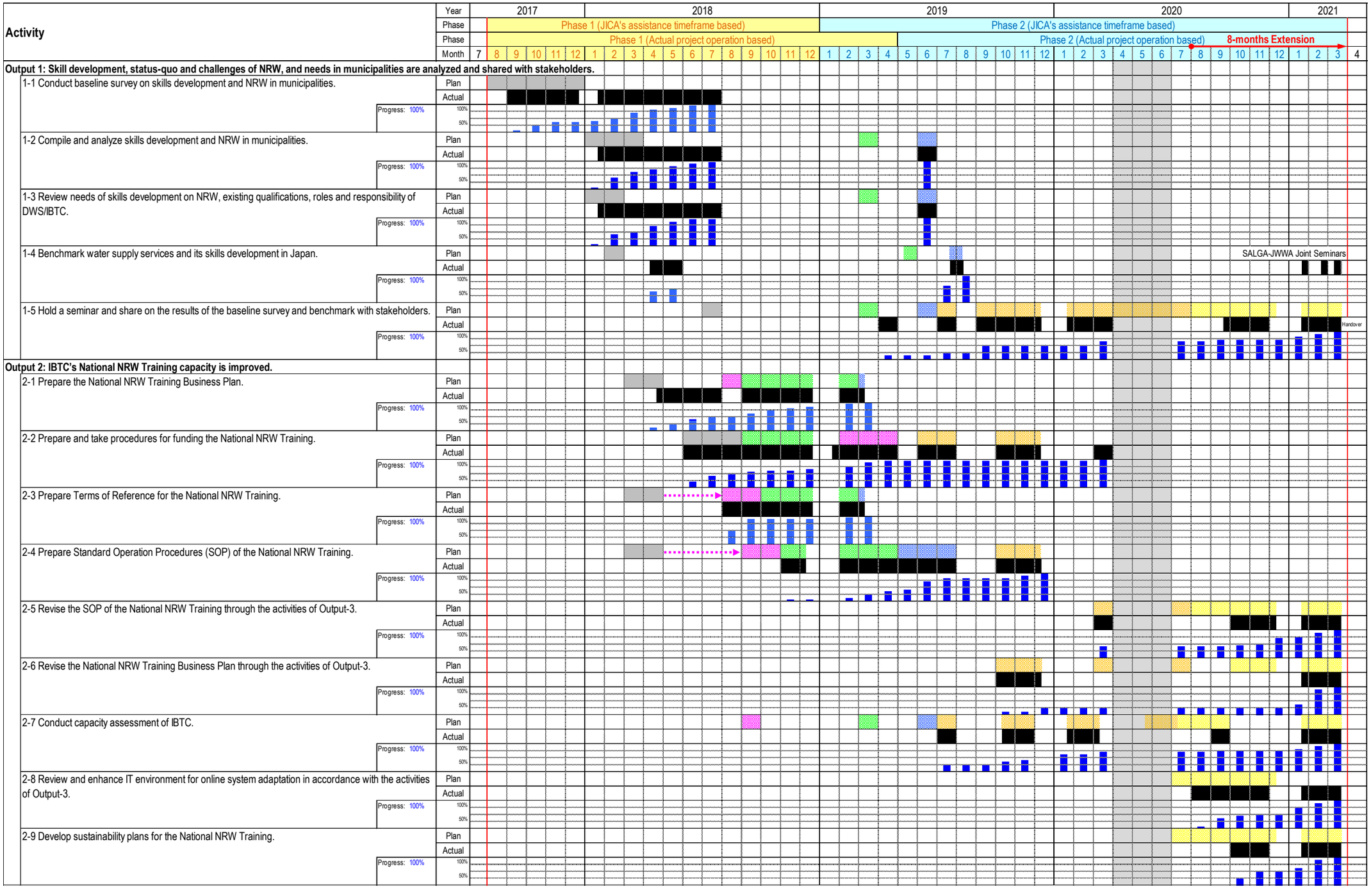


Table 2: Plan of Operation (PO_6) (2/3)

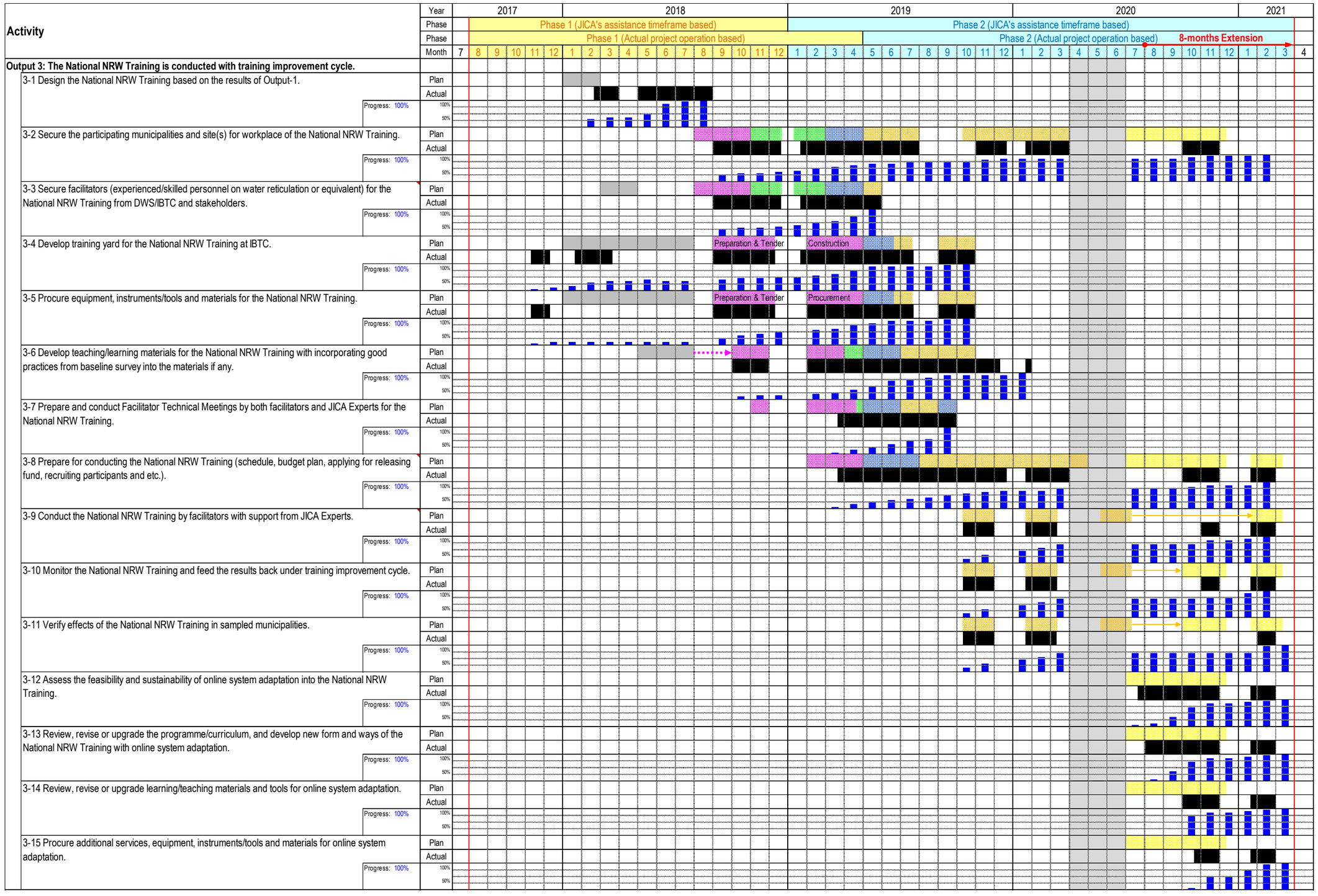
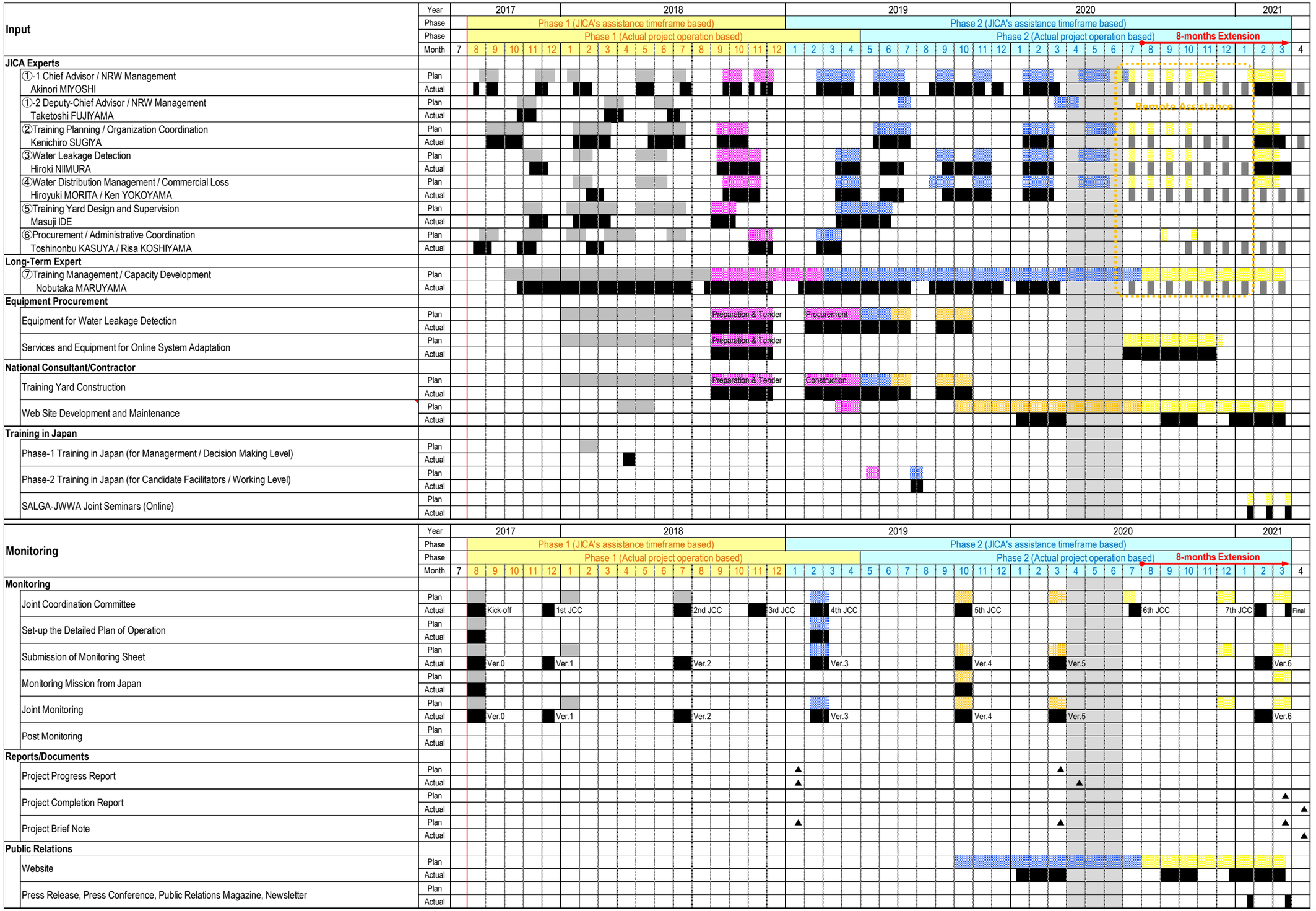


Table 2: Plan of Operation (PO_6) (3/3)



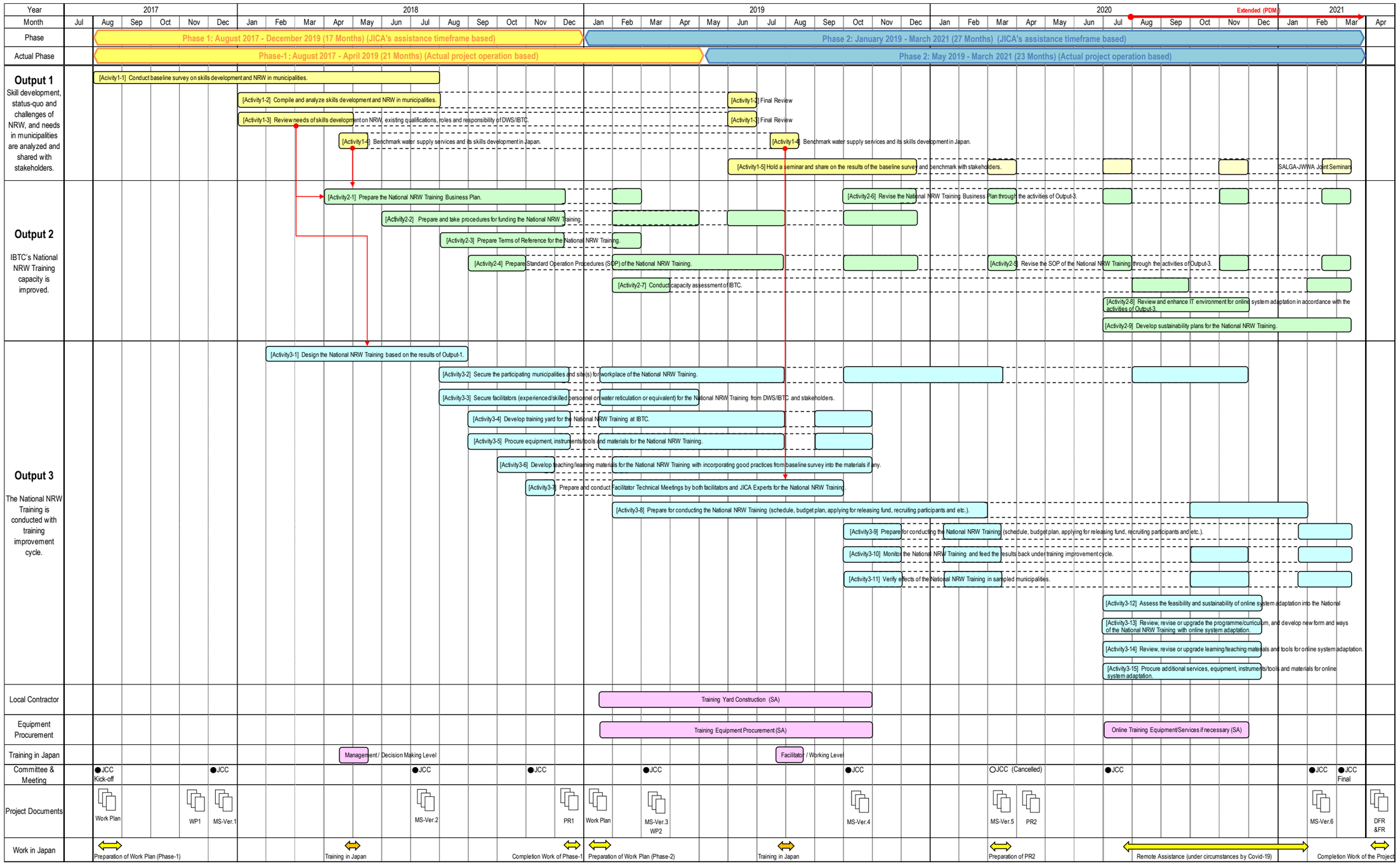


Figure 3: Project Activities' Flow (based on PO_6)

August 2017

Photo-1 Mini Workshop (DWS)

Photo-2 Monitoring Sheet Meeting Ver.0 (SALGA)

Photo-3 Kick-off Meeting (IBTC)

Photo-4 Kick-off Meeting (IBTC)

Photo-5 Kick-off Meeting (JICA's Technical Cooperation)

Photo-6 Kick-off Meeting (DWS's Explanation)

Photo-7 IBTC Facility Tour

Photo-8 Visit to Water Treatment Plant in Tshwane

September 2017

Photo-9 Meeting for Baseline Survey

Photo-10 Meeting with EWSETA

Photo-11 Explanation to LGSETA

Photo-12 Explanation to LGSETA

October 2017

Photo-13 Interview with Polokwane LM, Limpopo

Photo-14 Interview with Sol Plaatje LM, Northern Cape

Photo-15 Interview with Kouga LM, Eastern Cape

Photo-16 Interview with N. Mandela Bay, Eastern Cape

Photo-17 Interview with Buffalo City, Eastern Cape

Photo-18 Interview for Amathole DM, Eastern Cape

November 2017

Photo-19 Interview with Steve Tshwete LM, Mpumalanga

Photo-20 Interview with Mbombela LM, Mpumalanga

Photo-21 Interview for LMs, Western Cape

Photo-22 Interview with Ekurhuleni, Gauteng

Photo-23 Meeting with LM/DMs, KZN

Photo-24 Plumbing Training Yard eThekwini, KZN

Photo-25 Leak Detection Training Yard of Ugu DM, KZN

Photo-26 Technical Meeting for Training Yard (DWS)

December 2017

Photo-27 Test Excavation at Training Yard

Photo-28 Interview with Local Consultant

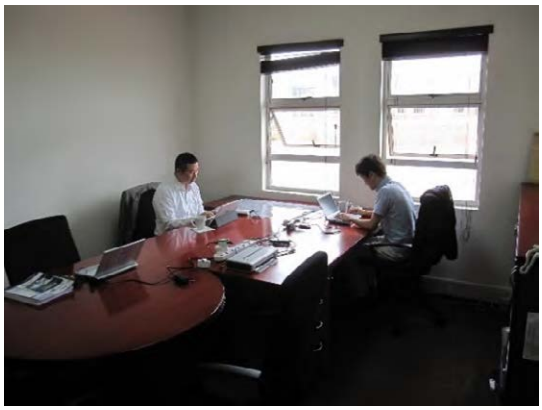


Photo-29 Project Office in IBTC

Photo-30 Meeting for Monitoring Sheet

Photo-31 The 1st JCC Meeting (Work Plan)

Photo-32 The 1st JCC Meeting (Monitoring Report)

January 2018

Photo-33 Interview with JB Marks LM, North West

Photo-34 Interview with Metsimaholo LM, Free State

Photo-35 Interview with Matjabeng LM, Free State

Photo-36 Meeting about National Qualification Framework

Photo-37 Meeting about Progress of Baseline Survey

Photo-38 Site Visit (Leak Repair by Tshwane)

February 2018

Photo-39 Interview with Sekhukhune DM, Limpopo

Photo-40 Meeting about Standard Drawings (Tshwane)

Photo-41 Meeting about Baseline Survey Results Analysis

Photo-42 Meeting about Baseline Survey Results Analysis

Photo-43 Meeting in Project Office at DWS Head Office

Photo-44 Electricity Inspection for Training Yard

March 2018

Photo-45 Site Visit to Reservoir of Tshwane

Photo-46 Site Visit to Water Source under Drought in Modimolle LM, Limpopo

Photo-47 Visit to Training Centre (Plumber), Tshwane

Photo-48 Visit to Training Centre (Plumber), Tshwane

Photo-49 Visit to Training Centre (Plumber), Tshwane

Photo-50 Meeting about New Qualification (WRP)

April 2018

Photo-51 PMC Meeting

Photo-52 PMC Meeting

Photo-53 The 1st Training in Japan (JICA Headquarters)

Photo-54 The 1st Training in Japan (Yokohama's Facility)

Photo-55 The 1st Training in Japan (Sedimentation, Yokohama)

Photo-56 The 1st Training in Japan (Yokohama's Facility)

Photo-57 The 1st Training in Japan (JWWA)

Photo-58 The 1st Training in Japan (Certification)

May 2018

Photo-59 Task Meeting about Business Plan

Photo-60 Benchmark Debriefing of the 1st Training in Japan

Photo-61 PMC Meeting

Photo-62 Water Loss Conference 2018 in Cape Town

Photo-63 DWS Labo

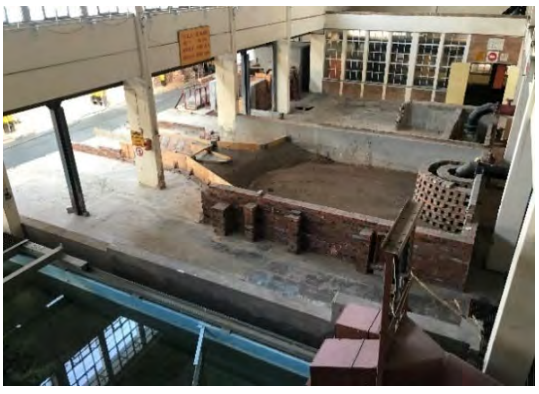


Photo-64 DWS Labo (Hydraulic Model)

June 2018

Photo-65 Meeting about Progress Monitoring

Photo-66 Meeting for Workplace Training

July 2018

Photo-67 Task Meeting about Training Programme

Photo-68 Meeting with Skills Development Provider (Private)

Photo-69 The 2nd JCC Meeting (Training Programme)

Photo-70 JICA Mission's Courtesy Visit to SALGA

Photo-71 JICA Mission's Visit to Tshwane Training Centre

Photo-72 JICA Mission's Visit to Tshwane Training Centre

September 2018

Photo-73 Discussion about Training Outline

Photo-74 Discussion about Training Yard and Equipment

Photo-75 PMC Meeting

Photo-76 Mini-Workshop on Training Outline

October 2018

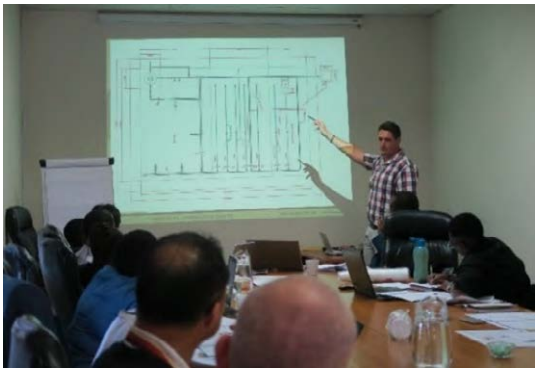


Photo-77 Presentation of Training Yard and Equipment

Photo-78 Meeting with Tshwane about Training Yard

November 2018

Photo-79 Meeting with WRP Qualification Development Group

Photo-80 PMC Meeting

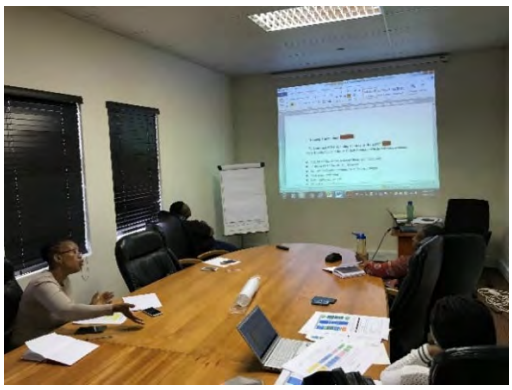


Photo-81 Meeting about Business Plan and SOP

Photo-82 Preparatory Meeting for the 3rd JCC Meeting

Photo-83 The 3rd JCC Meeting

Photo-84 The 3rd JCC Meeting

December 2018

Photo-85 Meeting with COO of LGSETA

Photo-86 Meeting with WRP Qualification Development Group

Photo-87 Meeting about Selection Criteria (WUE)

Photo-88 Follow-up Meeting for the 3rd JCC Meeting

February 2019

Photo-89 PMC Meeting

Photo-90 Presentation to LGSETA for Grant Application

Photo-91 Tender Opening of Training Yard Construction

Photo-92 Negotiation with the Lowest Bidder

March 2019

Photo-93 JICA Mission's Visit to KZN Province

Photo-94 JICA Mission's Visit to KZN Province

Photo-95 The 4th JCC Meeting

Photo-96 Facilitator Mobilization (Mbombela LM)

April 2019

Photo-97 PMC Meeting (SALGA)

Photo-98 Project Presentation (Water Summit, North West)

Photo-99 Project Presentation (WCWDM Forum in KZN)

Photo-100 Facilitator Mobilization (Cape Town)

May 2019

Photo-101 Yard Construction (Leak Hole on Steel Pipe)

Photo-102 Yard Construction (HDPE Pipe Laying)

Photo-103 Yard Construction (uPVC Pipe Laying)

Photo-104 Yard Construction (after Backfill)

June 2019

Photo-105 PMC Meeting

Photo-106 Discussion about Process in SOP

Photo-107 Supervision of Yard Construction

Photo-108 Training Yard (Pipe Connection Training Area)

Photo-109 Training Yard (Quantity Survey)

Photo-110 Training Yard (Leak Sound Check)

Photo-111 Training Equipment（Ground Microphone）

Photo-112 Training Equipment (Ultrasonic Flow Meter)

July 2019

Photo-113 The 1st Facilitator Technical Meeting

Photo-114 The 1st Facilitator Meeting

Photo-115 The 1st Facilitator Meeting

Photo-116 Municipality Mobilization (uMDM, KZN)

Photo-117 IBTC Branding Presentation

Photo-118 The 2nd Training in Japan

August 2019

Photo-119 The 2nd Training in Japan (JICA HQs)

Photo-120 The 2nd Training in Japan (JWWA)

Photo-121 The 2nd Training in Japan (Yokohama's Facility)

Photo-122 The 2nd Training in Japan (Yokohama's Facility)

Photo-123 The 2nd Training in Japan (Construction Site)

Photo-124 The 2nd Training in Japan (Tokyo's Centre)

Photo-125 The 2nd Training in Japan (Evaluation Meeting)

Photo-126 The 2nd Training in Japan (Certification)

September 2019

Photo-127 Briefing to Chief Director for WUE

Photo-128 Discussion about Training/Workplace Preparation

Photo-129 The 2nd Facilitator Technical Meeting

Photo-130 Benchmark Debriefing of the 2nd Training in Japan

October 2019

Photo-131 The 1st National NRW Training (IBTC)

Photo-132 The 1st National NRW Training (IBTC)

Photo-133 The 1st National NRW Training (IBTC)

Photo-134 The 1st National NRW Training (Workplace)

Photo-135 The 1st National NRW Training (Workplace)

Photo-136 The 1st National NRW Training (Workplace)

Photo-137 The 1st National NRW Training (Workplace)

Photo-138 The 5th JCC Meeting

November 2019

Photo-139 The 1st National NRW Training (IBTC)

Photo-140 The 1st National NRW Training (IBTC)

Photo-141 The 1st National NRW Training (IBTC)

Photo-142 The 1st National NRW Training (Workplace)

Photo-143 The 1st National NRW Training (Workplace)

Photo-144 Meeting with DWS-RBIG about DWS's Grant

Photo-145 Municipality Mobilization (Metsimaholo LM)

Photo-146 Municipality Mobilization (Mbombela LM)

January 2020

Photo-147 The 2nd National NRW Training (IBTC)

Photo-148 The 2nd National NRW Training (IBTC)

Photo-149 The 2nd National NRW Training (IBTC)

Photo-150 The 2nd National NRW Training (IBTC)

Photo-151 The 2nd National NRW Training (IBTC)

Photo-152 The 2nd National NRW Training (IBTC)

Photo-153 The 2nd National NRW Training (IBTC)

Photo-154 The 2nd National NRW Training (IBTC)

February 2020

Photo-155 The 2nd National NRW Training (Workplace)

Photo-156 The 2nd National NRW Training (Workplace)

Photo-157 The 2nd National NRW Training (Workplace)

Photo-158 The 2nd National NRW Training (Workplace)

Photo-159 The 2nd National NRW Training (Workplace)

Photo-160 The 2nd National NRW Training (Workplace)

Photo-161 The 2nd National NRW Training (Workplace)

Photo-162 The 2nd National NRW Training (Workplace)

March 2020

Photo-163 The 2nd National NRW Training (Output Seminar)

Photo-164 The 2nd National NRW Training (Output Seminar)

Photo-165 The 2nd National NRW Training (Certification)

Photo-166 The 2nd National NRW Training (Participants)

Photo-167 Visit by SALGA National Water & Sanitation G.

Photo-168 PMC Meeting

November 2020

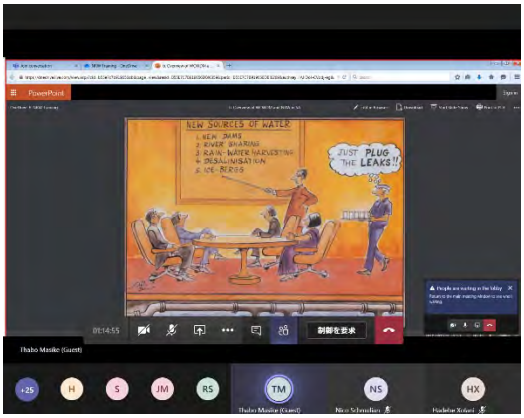


Photo-169 The 3rd National NRW Training (Online)

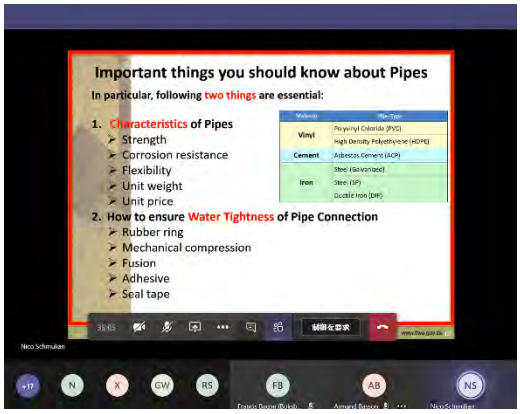


Photo-170 The 3rd National NRW Training (Online)

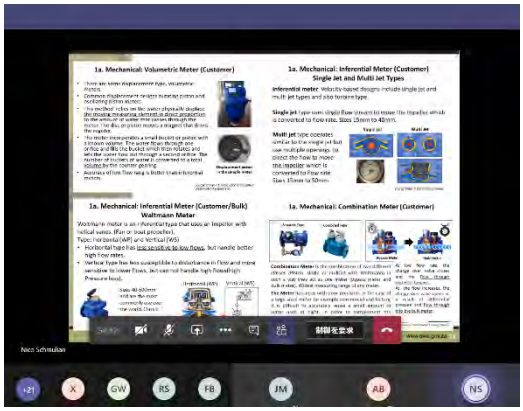


Photo-171 The 3rd National NRW Training (Online)

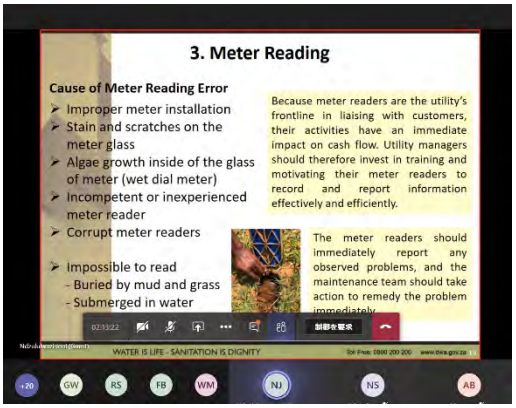


Photo-172 The 3rd National NRW Training (Online)

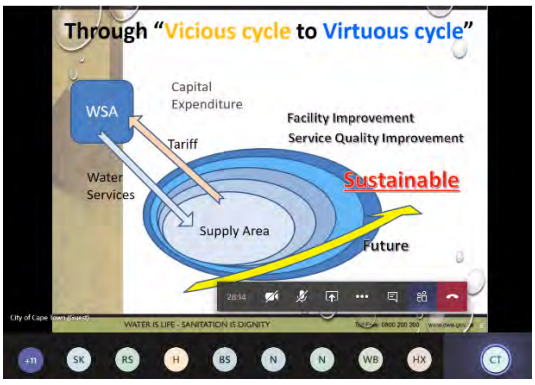


Photo-173 The 3rd National NRW Training (Online)

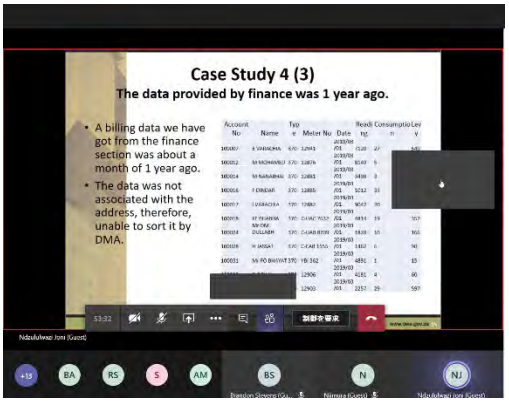


Photo-174 The 3rd National NRW Training (Online)

Photo-175 The 3rd National NRW Training (Online)

Photo-176 The 3rd National NRW Training (Online)

January 2021

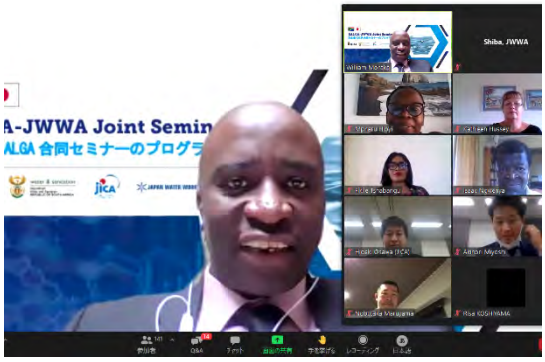


Photo-177 The 1st SALGA-JWWA Joint Semiar (Facilitation)

Photo-178 The 1st SALGA-JWWA Joint Semiar (Intro., JICA)

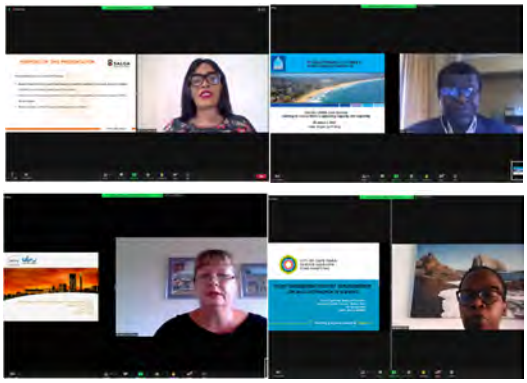


Photo-179 The 1st SALGA-JWWA Joint Semiar
Day-1: SALGA, eThekwini, Johannesburg, Cape Town

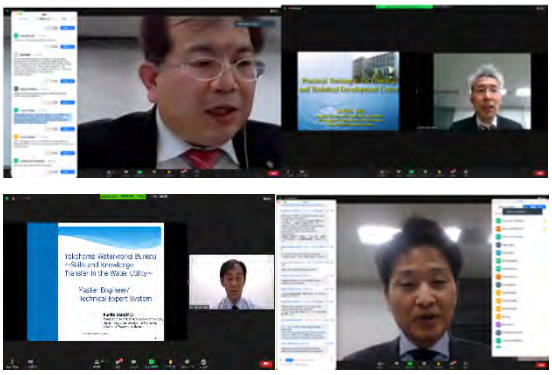


Photo-180 The 1st SALGA-JWWA Joint Semiar
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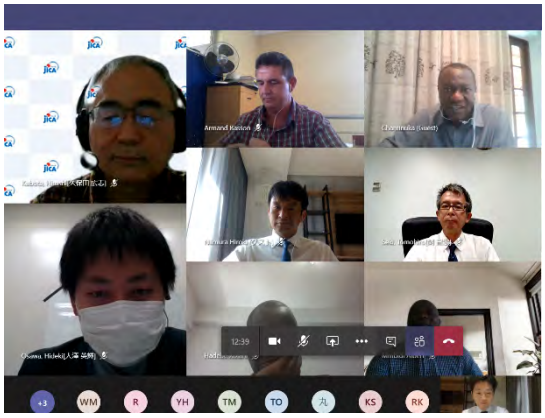

Photo-181 The 7th JCC Meeting

Photo-182 The 7th JCC Meeting

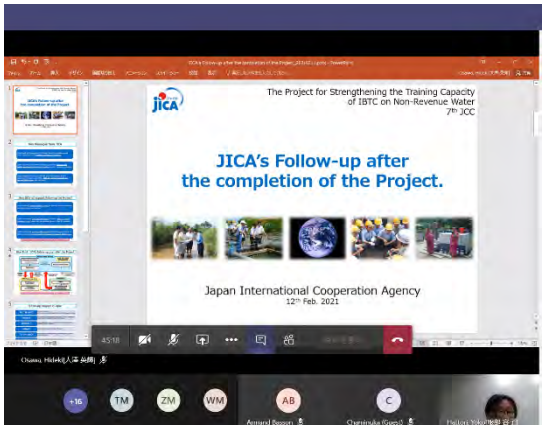

Photo-183 The 7th JCC Meeting

Photo-184 The 7th JCC Meeting

Photo-185 The 2nd SALGA-JWWA Joint Semiar (Facilitation)

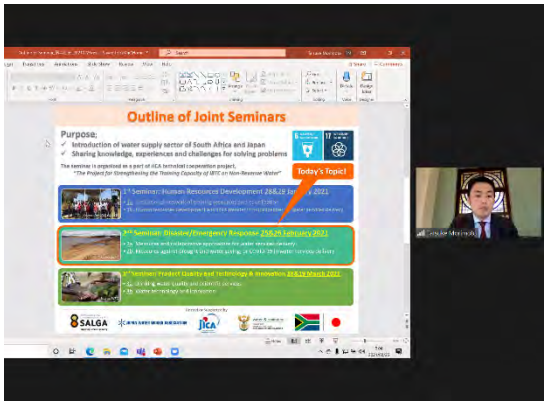

Photo-186 The 2nd SALGA-JWWA Joint Semiar (Intro., JICA)

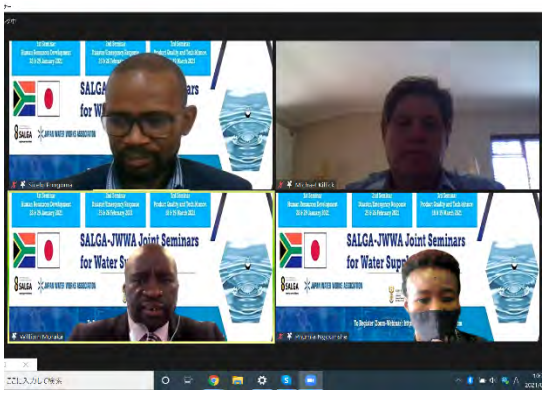

Photo-187 The 2nd SALGA-JWWA Joint Semiar
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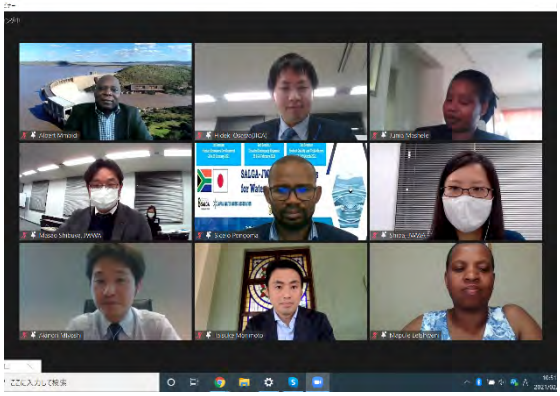

Photo-188 The 2nd SALGA-JWWA Joint Semiar

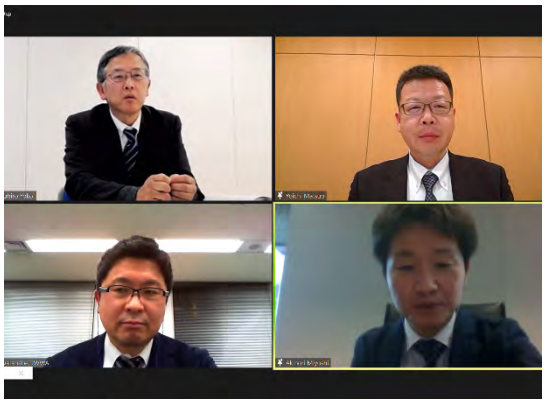

Photo-189 The 2nd SALGA-JWWA Joint Semiar
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March 2021

Photo-191 The 3rd SALGA-JWWA Joint Seminar (SALGA-CEO)

Photo-192 The 3rd SALGA-JWWA Joint Seminar (JWWA-E.D.)

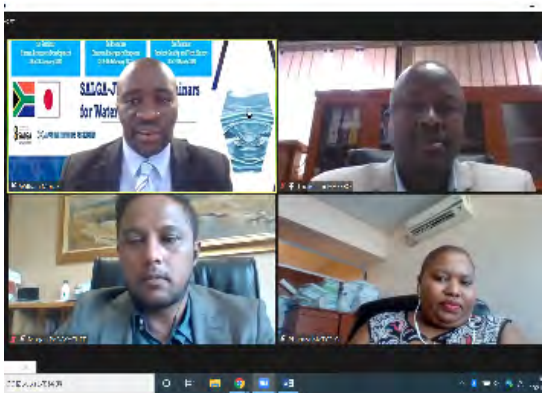

Photo-193 The 3rd SALGA-JWWA Joint Seminar
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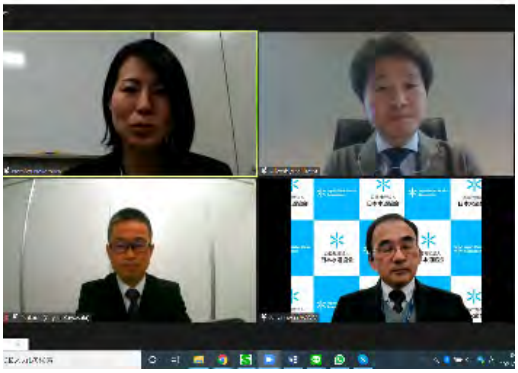

Photo-195 The 3rd SALGA-JWWA Joint Seminar
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Photo-196 The 3rd SALGA-JWWA Joint Seminar

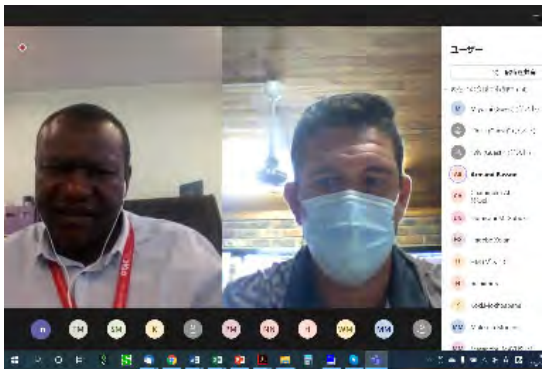

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Photo-199 Hand Over Ceremony
Minister of Human Settlements, Water and Sanitatoin

Photo-200 Hand Over Ceremony
Ambassador of Japan to South Africa

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Chief Representative of JICA South Afirca Office

Photo-202 Hand Over Ceremony
President of SALGA

Photo-203 Hand Over Ceremony
Deputy Minister: Water and Sanitation / MC

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DDG: International Water Support, DWS

Photo-205 Hand Over Ceremony
Centre Manager of IBTC, DWS

Photo-206 Hand Over Ceremony
Representive of Participating Municipality

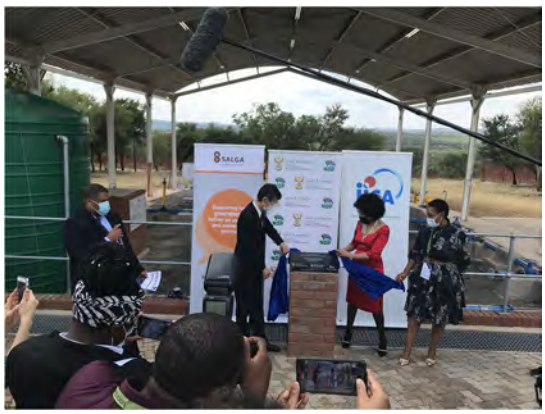


Photo-207 Hand Over Ceremony

Photo-208 Hand Over Ceremony (Demonstration)

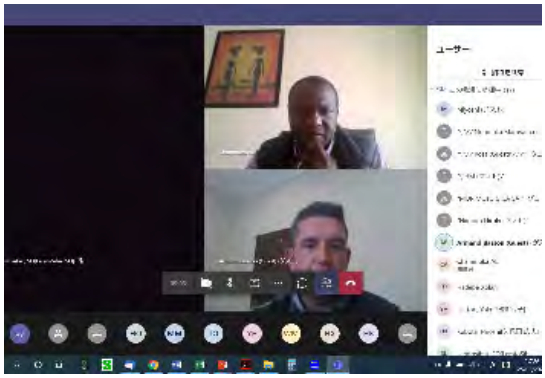


Photo-209 The Final JCC Meeting

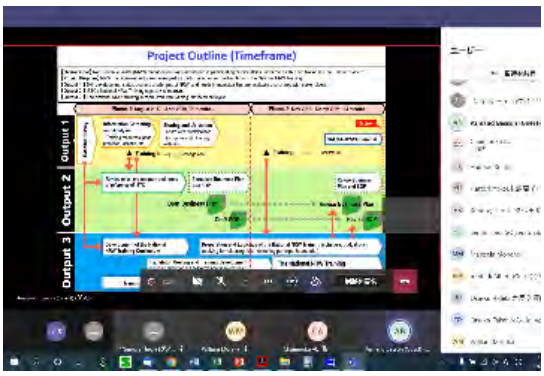
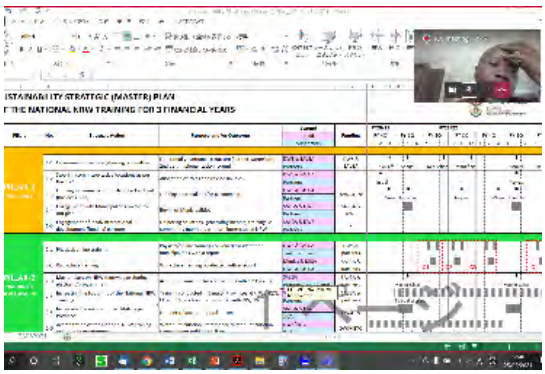


Photo-210 The Final JCC Meeting (Final Report)



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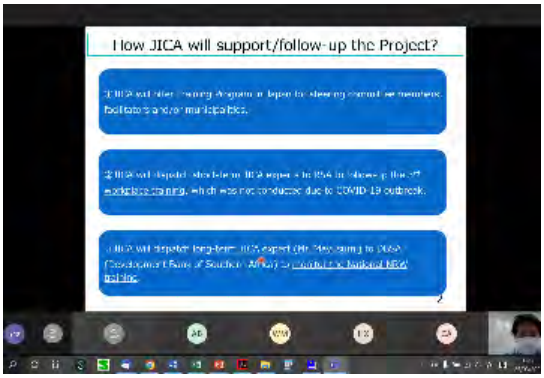

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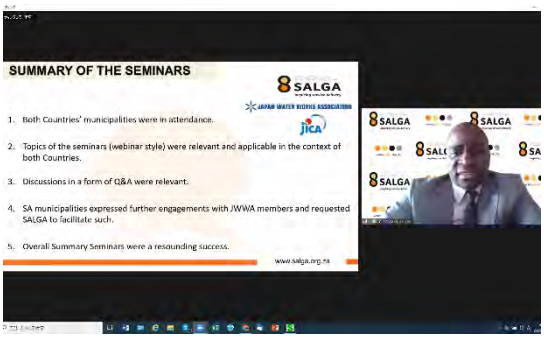

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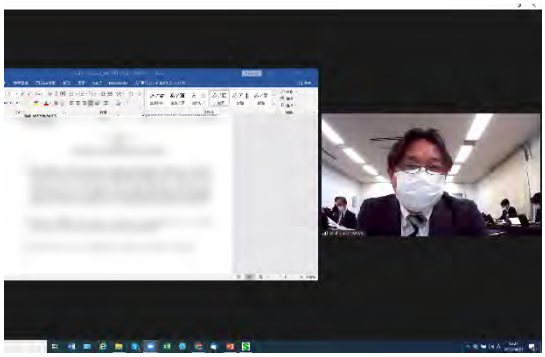

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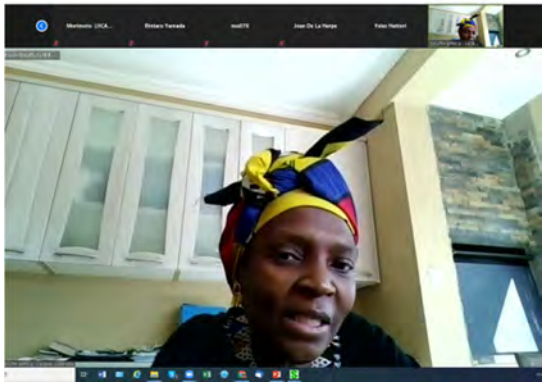

Photo-221 Joint Seminar Debriefing
Closing Address by DDG: International Water Support, DWS

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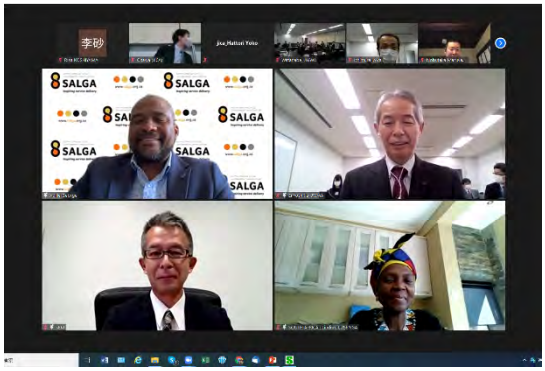

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APPENDICIES

ABBREVIATION

AENE	Adjusted Estimates of National Expenditure
AFS	Annual Financial Statements
AWSC	Area Water Service Cooperative
BOT	Built-Operate-Transfer
BTO	Built-Transfer-Operate
CD	Chief Director
CHE	Council on Higher Education
CMA	Catchment Management Authority
CoGTA	Cooperative Governance & Traditional Affairs
DBSA	Development Bank of Southern Africa
DDG	Deputy Director General
DG	Director General
DHET	Department of Higher Education and Training
DIRCO	Department of International Relations and Cooperation
DM	District Municipality
DMA	District-Metered Area
DWS	Department of Water and Sanitation
ENE	Estimates of National Expenditure
ETDPSETA	Education, Training and Development Practices Sector Education and Training Authority
EWSETA	Energy & Water Sector Education & Training Authority
FET	Further Education and Training
FETWater	Framework Programme for Research, Education & Training in the Water Sector
GFETQF	General and Further Education and Training Qualifications Framework
HEQF	Higher Education Qualification Framework
HRD	Human Resources Development
IBOM	Infrastructure Build, Operate and Maintenance (DWS, former NWRI)
IBTC	Infrastructure Branch Training Centre
ICDL	International Computer Driving License
IDP	Integrated Development Plan
IMESA	Institute of Municipal Engineering of Southern Africa
ISDG	Infrastructure Skills Development Grant
IWS	International Water Support (DWS)
JWWA	Japan Water Works Association
LGSETA	Local Government Sector Education and Training Authority
LM	Local Municipality
MerSETA	Manufacturing, Engineering and Related Services SETA
Metro	Metropolitan Municipality
MHLW	Ministry of Health, Labor and Welfare (Japan)
MISA	Municipal Infrastructure Support Agency
MTEF	Medium Term Expenditure Framework
NAMB	National Artisans Moderating Body
NCOP	National Council of Province
NQF	National Qualification Framework
NRW	Non-Revenue Water
NSA	National Skills Authority
NSF	National Skills Fund
NSDS	National Skills Development Strategy

NWRI	National Water Resources Infrastructure (DWS)
NWRS	National Water Resource Strategy
OHS	Occupational Health and Safety
OQF	Occupational Qualifications Framework
OS	Directorate: Operational Support (DWS)
PCM	Project Cycle Management
PDM	Project Design Matrix
PIVOTAL	Professional, Vocational, Technical and Academic Learning programmes
PMC	Project Management Committee
PO	Plan of Operation
PRV	Pressure Reducing Valve
QCHE	Quality Council on Higher Education
QCTO	Quality Council for Trades and Occupations
RBIG	Regional Bulk Infrastructure Grant
R/D	Record of Discussion
RPL	Recognition of prior learning
RWA	Rand Water Academy
SABS	South African Bureau of Standards
SADC	Southern African Development Community
SAICE	South African Institution of Civil Engineering
SANS	South African National Standards
SARS	South African Revenue Services
SALGA	South African Local Government Association
SAQA	South African Qualifications Authority
SDL	Skills Development Levy
SDP	Skills Development Provider
SETA	Sector Education & Training Authority
SOP	Standard Operation Procedures
SSP	Sector Skills Plan
TOR	Terms of Reference
TVET	Technical and Vocational Education and Training
Umalusi	General and Further Education and Training Quality Council
US	Unit Standard
WB	Water Board
WCWDM	Water Conservation / Water Demand Management
WMA	Water Management Area
WRP	Water Reticulation Practitioner
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSIG	Water Services Infrastructure Grant
WSLG	Water Sector Leadership Group
WSP	Water Services Provider
WUE	Directorate: Water Use Efficiency (DWS)
YWWB	Yokohama Waterworks Bureau

Chapter 1 Background and Outline of the Project

1.1 Background of the Project

In the course of reconstruction and decentralization in South Africa from 1990's, municipalities in South Africa have taken a responsibility of water supply as Water Services Authority (WSA) with human resources transfer and technical supports from the Department of Water and Sanitation (DWS) and Water Boards (WBs). However, most of the municipalities have faced challenges such as deterioration of services and operation & maintenance due to the loss of competent personnel, lack of adequate skills and knowledge succession, and insufficiency of systematic training opportunity due to an outflow and retirement of competent human resources. This deterioration causes a difficulty in improving Non-Revenue Water (NRW) in South Africa struggling against frequent water scarcity. So, human resources development, enhancement and dissemination of skills and knowledge such as NRW reduction can be considered the keys to success in sustainable water supply services of municipalities in South Africa.

Furthermore, capacity development and human resources development of municipalities together with job creation are national priority issues emphasized under National Development Plan 2030 (NDP) and National Water Resources Strategy II (NWRS-II). Furthermore, the Department of Higher Education and Training (DHET) and Sector Educational and Training Authority (SETA) in local government and energy & water sectors are focusing on increase in skilled workers and artisans under National Skills Development Strategy III (NSDS-III).

Given this background, DWS intends to position its "Infrastructure Branch Training Centre (IBTC)", which was constructed in 2014, as a centre to provide training to develop skills of municipality's staff and also as a hub of coordination and information sharing of human resources development in the water sector. Nonetheless, IBTC is short of performance and capability to meet needs in the water sector. Consequently, the South African Government requested the Japanese Government for technical cooperation in establishing a training scheme and procedures as well as in strengthening training implementation to improve IBTC's management capacity. In response to this request, Japan International Cooperation Agency (JICA) conducted the detailed planning survey in November to December 2016, then DWS and JICA reached an agreement on implementation of "Project for Strengthening the Training Capacity of IBTC on Non-Revenue Water" (hereinafter "the Project") by singing of the Record of Discussion (R/D) in April 2017.

1.2 Project Design

After revisions based on the approval of project monitoring results and suggestions in the Joint Coordinating Committee (JCC) meetings, "Overall Goal", "Project Purpose", "Outputs" and "Activities" were finalized as below. Refer to Table 1 (Project Design Matrix, Version 3: PDM_3) and Table 2 (Plan of Operation, Version 6: PO_6) in the front pages for details.

Overall Goal

Non-Revenue Water (NRW) management skills are utilized in participating municipalities under the established National NRW Training system.

Project Purpose

NRW management skills are developed for participating municipalities through the National NRW Training by IBTC.

Output-1: Skill development, status-quo and challenges of NRW, and needs in municipalities are analyzed and shared with stakeholders.

Activity 1-1: Conduct baseline survey on skills development and NRW in municipalities.
Activity 1-2: Compile and analyze skills development and NRW in municipalities.
Activity 1-3: Review needs of skills development on NRW, existing qualifications, roles and responsibility of DWS/IBTC.
Activity 1-4: Benchmark water supply services and its skills development in Japan.
Activity 1-5: Hold a seminar and share on the results of the baseline survey and benchmark with stakeholders.

Output-2: IBTC's National NRW Training capacity is improved.

Activity 2-1: Prepare the National NRW Training Business Plan.
Activity 2-2: Prepare and take procedures for funding the National NRW Training.
Activity 2-3: Prepare Terms of Reference for the National NRW Training.
Activity 2-4: Prepare Standard Operation Procedures (SOP) of the National NRW Training.
Activity 2-5: Revise the SOP of the National NRW Training through the activities of Output-3.
Activity 2-6: Revise the National NRW Training Business Plan through the activities of Output-3.
Activity 2-7: Conduct capacity assessment of IBTC.
Activity 2-8: Review and enhance IT environment for online system adaptation in accordance with the activities of Output-3.
Activity 2-9: Develop sustainability plans for the National NRW Training.

Output-3: The National NRW Training is conducted with training improvement cycle.

Activity 3-1: Design the National NRW Training based on the results of Output-1.
Activity 3-2: Secure the participating municipalities and site(s) for workplace of the National NRW Training.
Activity 3-3: Secure facilitators (experienced/skilled personnel on water reticulation or equivalent) for the National NRW Training from DWS/IBTC and stakeholders.
Activity 3-4: Develop training yard for the National NRW Training at IBTC.
Activity 3-5: Procure equipment, instruments/tools and materials for the National NRW Training.
Activity 3-6: Develop teaching/learning materials for the National NRW Training with incorporating good practices from baseline survey into the materials if any.
Activity 3-7: Prepare and conduct Facilitator Technical Meetings by both facilitators and JICA Experts for the National NRW Training.
Activity 3-8: Prepare for conducting the National NRW Training (schedule, budget plan, applying for releasing fund, recruiting participants and etc.)
Activity 3-9: Conduct the National NRW Training by facilitators with support from JICA Experts.
Activity 3-10: Monitor the National NRW Training and feed the results back under training improvement cycle.
Activity 3-11: Verify effects of the National NRW Training in sampled municipalities.
Activity 3-12: Assess the feasibility and sustainability of online system adaptation into the National NRW Training.
Activity 3-13: Review, revise or upgrade the programme / curriculum, and develop new form and ways of the National NRW Training with online system adaptation.
Activity 3-14: Review, revise or upgrade learning / teaching materials and tools for online system adaptation.
Activity 3-15: Procure additional services, equipment, instruments / tools and materials for online system adaptation.

1.3 Project Site

- Gauteng Province and all other Provinces (refer to Figure 2 in the front pages)
  Head offices of implementing organisations are located in City of Tshwane, Gauteng Province and IBTC at the lakeside of Roodeplaat Dam in the city. The Project conducted a baseline survey throughout the country in the Phase 1, and also targeted the municipalities selected as Water Services Authority (WSA) from nationwide through the National NRW Training provision in the Phase 2.

1.4 Project Period

- Project Period: August 2017 to March 2021 (44 months)

  Phase 1: August 2017 to December 2018 (17 months)
  Phase 2: January 2019 to March 2021 (27 months)

  Note: Some documents prepared in the Project describes the Phase 1: August 2017 to April 2019 (21 months) and the Phase 2: May 2019 to March 2021 (23 months) due to the difference in the phased period between JICA's assistance timeframe and the actual project operation.
  This project final report was prepared in the end of the Phase 2 and covers all project information from the commencement of the Project in the Phase 1.

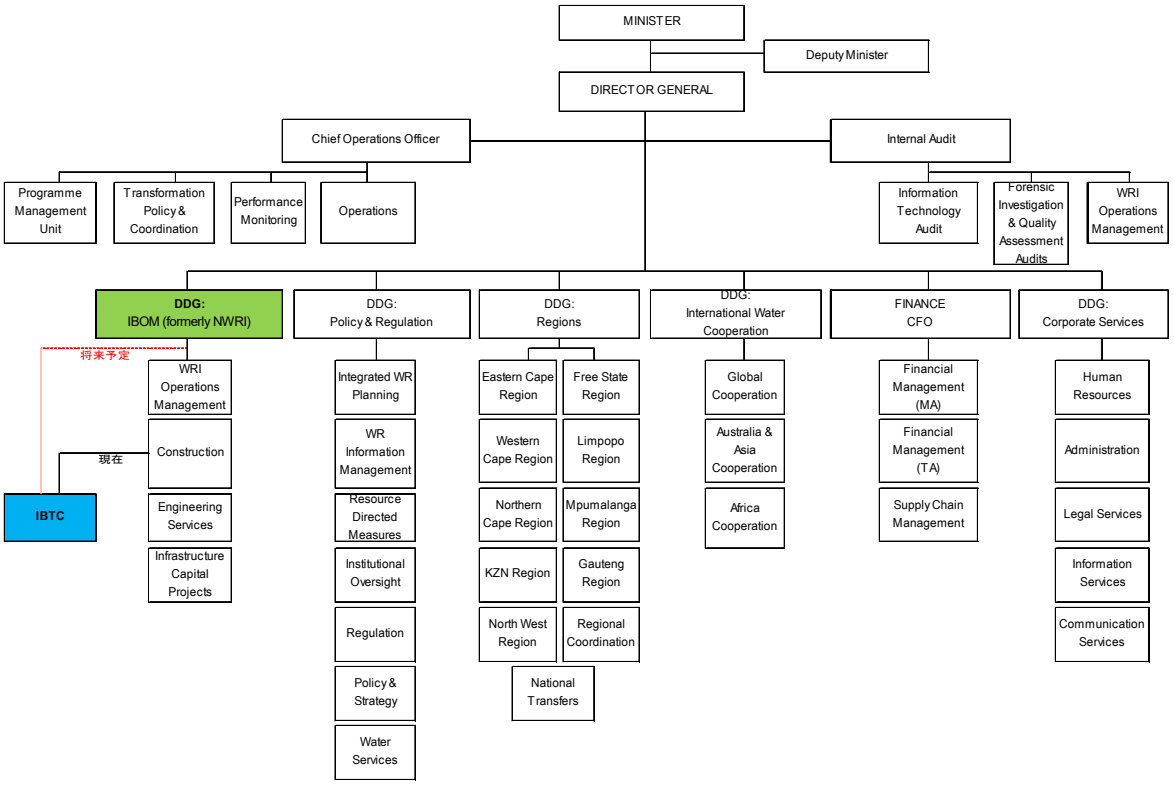
1.5 South African Counterparts

- Implementing organization: Department of Water and Sanitation (DWS) / Infrastructure Branch Training Centre (IBTC) and South African Local Government Association (SALGA)
  * Chief Directorates: Engineering Services and Construction in charge of IBTC, Directorate: Water Use Efficiency (WUE), Directorate: Operation Support (OS) and Directorate: Official Development Assistance (ODA) of DWS participated in the Project. In addition, technical officials of municipalities cooperated in developing and conducting the National NRW Training as Facilitators.
- Direct beneficiaries: DWS, IBTC and its personnel, Facilitators selected
- Indirect beneficiaries: Municipalities (Water Services Authorities)
- End Beneficiaries: Customers/consumers of water supplied by Municipalities

Figure 1-1 shows the DWS's organogram including Branches and Chief Directorates participating in project implementation. DWS has been undergoing restructuring, for example, considering a change of IBTC's jurisdiction from the "Chief Directorate: Construction" to the "Branch: IBOM (former National Water Resources Infrastructure: NWRI).

Besides IBTC, the Branch: IBOM owes two satellite offices (Tzaneen and Standerton) under the Chief Directorate: Construction for training staff and the DWS Labo located in Pretoria West under the Chief

Directorate: Engineering Services.



Source: DWS
Note: This may differ from the actual because organization structure has been under review of restructuring.

Figure 1-1: DWS's Organogram

Table 1-1 shows South African side project members in the Project.

Table 1-1: South African Side Project Members

Role in Project Implementation	Title and Position
Project Management Committee (PMC) Chairperson	Chief Director: Engineering Services, IBOM, DWS Mr. Aloious Chaminuka
Project Director PMC Leader	Director: Technical Engineering Services, IBOM, DWS Mr. Vincent Monene
Co-Project Director PMC Advisor / Leader	Director: Water Sustainability and Innovations SALGA Ms. William Moraka
Project Manager (Operational) PMC Leader	Centre Manager, IBTC, DWS Ms. Rosa Mfomadi Rahube
Co-Project Manager (Technical) PMC Leader	Director, Water Use Efficiency, P&I, DWS Mr. Hadebe Xolani
Member PMC Leader / Secretariat	Director: ODA, IWS, DWS Mr. Albert Mmbidi
Member PMC Leader	Director: Operational Support, PMU, DWS Ms. Kentse Mathiba
Member	Director: Planning, Monitoring and Evaluation, DWS-KZN Mr. Michael Singh
Member	Training Manager, IBTC, DWS

Role in Project Implementation	Title and Position
	Ms. Kgoputso Sekgoilane (Vacant since December 2020)
Member	Quality Assurer, IBTC, DWS Ms. Makola Lerato
Member	IBTC, DWS Ms. Verusha Govender
Member	Water Use Efficiency, P&I, DWS Mr. Thabo Masike
Member	Water Use Efficiency, P&I, DWS Mr. Padi Andries
Member	Water Use Efficiency, P&I, DWS Ms. Mabaso Samkelisiwe
Member	Water Use Efficiency, P&I, DWS Ms. Mboweni Zinzi
Member	Operational Support, PMU, DWS Mr. Maphutha Tsibiso
Member PMC Coordinator	Construction, IBOM, DWS Mr. Armand Basson
Member	Construction, IBOM, DWS Mr. Riaan Stassen
Member PMC Secretariat	ODA, IWS, DWS Ms. Mtsweni Zanu

1.6 Japanese Counterparts (JICA Experts)

Table 1-2 shows Japanese side project members as JICA Experts.

Table 1-2: Japanese Side Project Members (JICA Experts)

Position in the Project	Name	Company
Chief Advisor / NRW Management	Akinori MIYOSHI	YEC
Deputy Chief Advisor / NRW Management	Taketoshi FUJIYAMA	YEC
Skills Programme Planning / Organization Coordination	Ken-ichiro SUGIYA	YEC
Water Leakage Detection	Hiroki NIIMURA	YEC
Water Distribution Control / Commercial Loss 1	Hiroyuki MORITA	YWC
Water Distribution Control / Commercial Loss 2	Ken YOKOYAMA	YWC
Training Yard Design and Supervision	Masuji IDE	YWC
Procurement / Administrative Coordination (-Sep 2020)	Toshinobu KASUYA	YEC
Procurement / Administrative Coordination (Oct 2020-)	Risa KOSHIYAMA	YEC
Training Management/Human Resource Development	Nobutaka MARUYAMA	JICA

Remarks: YEC: Yachiyo Engineering Co., Ltd. YWC: Yokohama Water Co., Ltd.

Chapter 2 Project Operation and Implementation

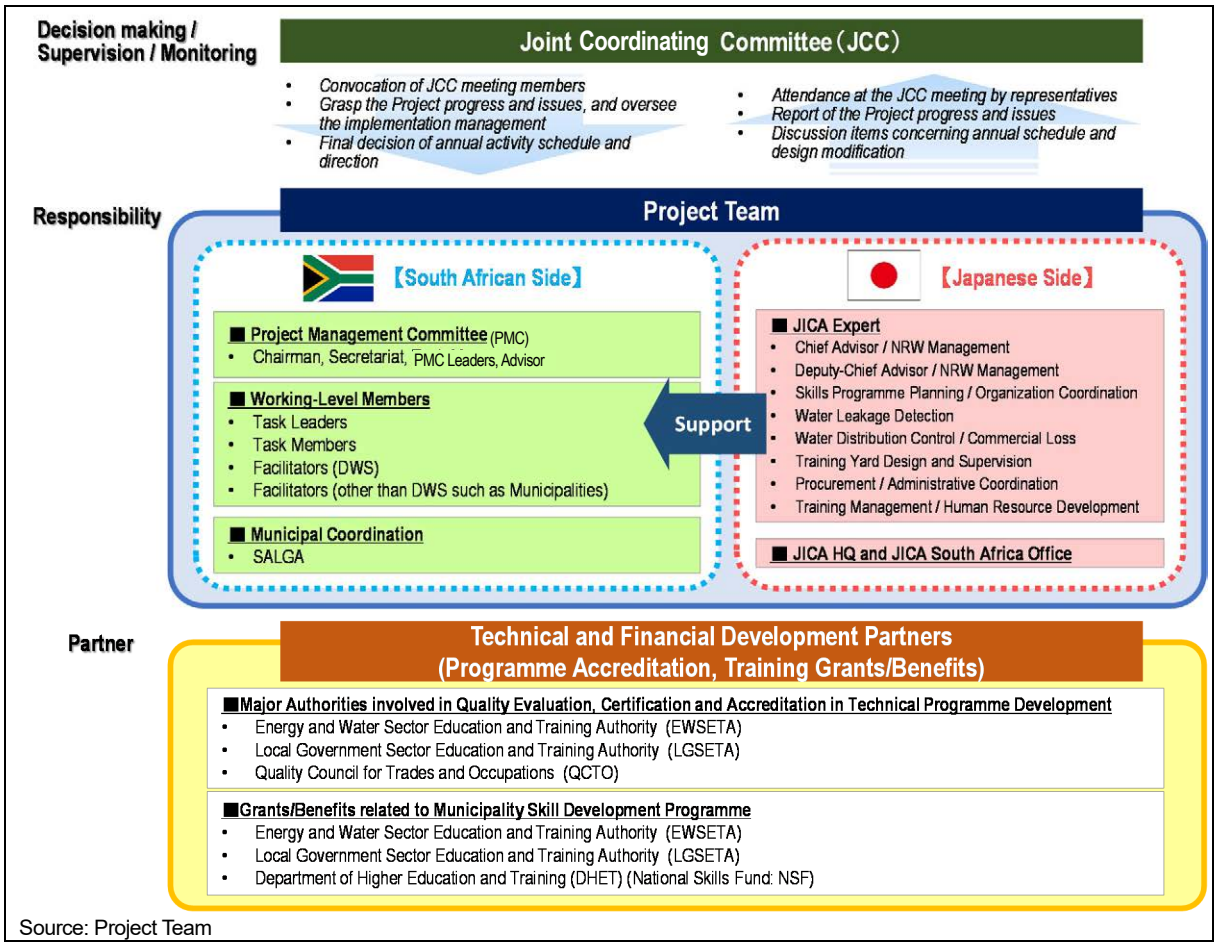
2.1 Principles of Project Operation and Implementation

In consideration of the background and outline of the Project, status and issues surrounding the Project, as well as position and role of the Project, the Project Team implemented the Project based on the following principles:

Principle 1: Management/business standpoint and resources for sustainability
Principle 2: Development of interactive win-win partnership
Principle 3: Strategically and appropriately-timed trainings in Japan
Principle 4: Flexible and smooth project implementation
Principle 5: Quality self-management in project implementation

2.2 Project Operation and Implementation Framework

Figure 2-1 shows the overall project operation structure, and Figure 2-2 shows the project implementation structure (Project Management Committee: PMC, activities/tasks and members).



Source: Project Team

Figure 2-1: Overall Project Operation Structure

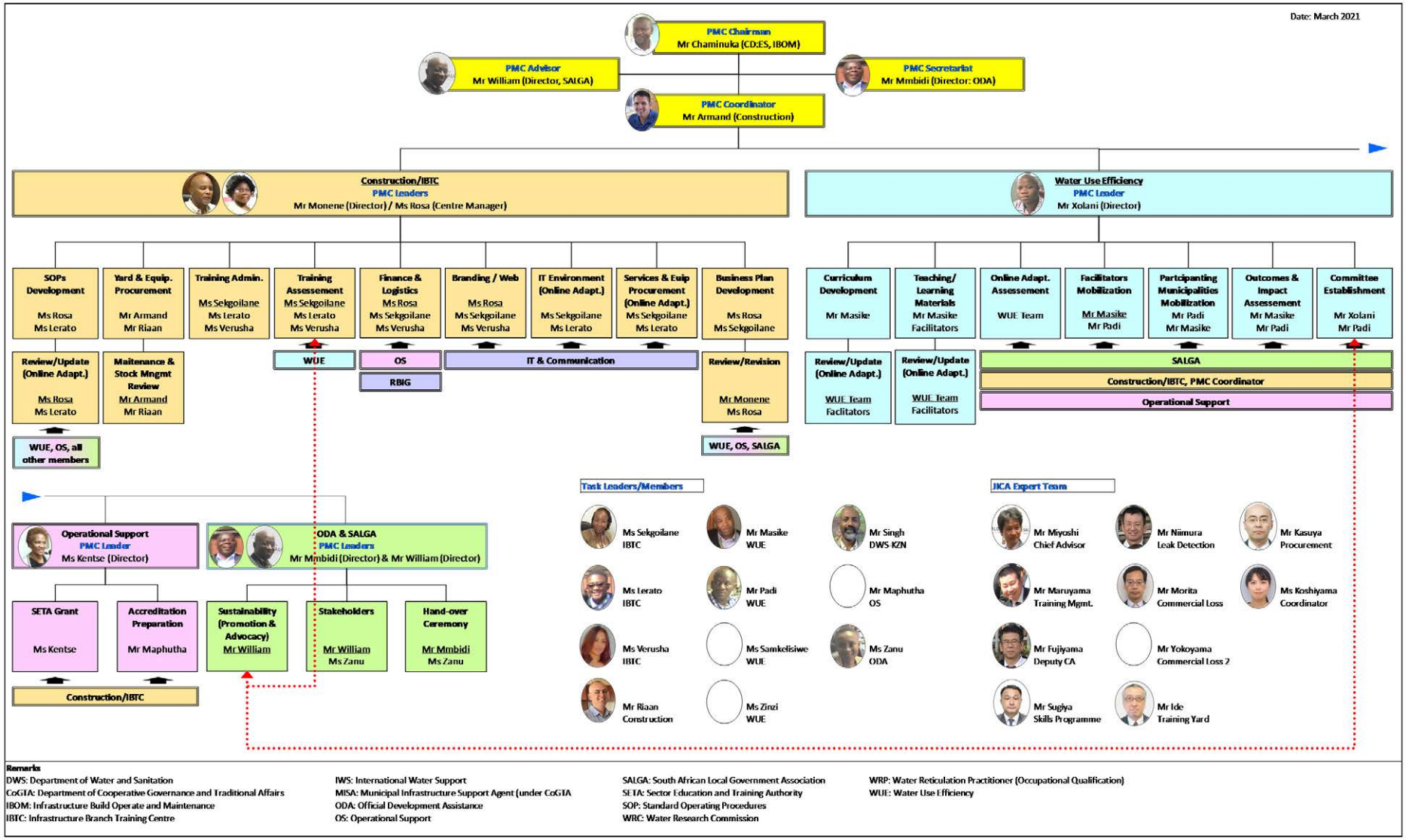


Figure 2-2: Project Implementation Structure

2.3 Project Monitoring

The Project conducted a series of project monitoring jointly as below in order to monitor progress, achievement of Project Purpose and Outputs, review of plan and strategy for maximum impact and risk management

- The 1st Project Monitoring : December 2017 (Monitoring Period: Aug. to Dec. 2017)
- The 2nd Project Monitoring : July 2018 (Monitoring Period: Jan. to Jul. 2018)
- Provisional Project Monitoring : November 2018 (Monitoring Period: Aug. to Nov. 2018, without monitoring sheets)
- The 3rd Project Monitoring : March 2019 (Monitoring Period: Aug. 2018 to Feb. 2019)
- The 4th Project Monitoring : October 2019 (Monitoring Period: Feb. to Sep. 2019)
- The 5th Project Monitoring : March 2020 (Monitoring Period: Oct. 2019 to Mar. 2020)
- The 6th Project Monitoring : February 2021 (Monitoring Period: Apr. 2020 to Jan. 2021)

As a result of project monitoring, Project Monitoring Sheets were prepared (refer to Appendix 1) which were presented and approved in the JCC meetings as below.

2.4 Joint Coordinating Committee (JCC)

The Joint Coordinating Committee (JCC) was established with the objectives of serving as the project's decision-making, supervision and monitoring mechanism. In addition, follow-up meetings were held to confirm progress, problem and issues, supervise/advise project members, and make decisions of schedule and direction. In principle, decision-making (acceptance and approval) on agenda items was based on the principle of complete agreement by raising hands at the end of each meeting.

- Kick-off Meeting : 17th August 2017
- The 1st JCC Meeting : 17th December 2017
- The 2nd JCC Meeting : 25th July 2018
- The 3rd JCC Meeting : 29th November 2018
- Follow-up Meeting : 11th December 2018
- The 4th JCC Meeting : 12th March 2019
- The 5th JCC Meeting : 17th October 2019
- The 6th JCC Meeting : 17th July 2021
- The 7th JCC Meeting : 12th February 2021
- The Final JCC Meeting : 25th March 2021

Table 2-1 shows the JCC members.

Table 2-1: JCC Members

Role in JCC	Organization and Position	No.
Chairperson		
Chairperson (SA)	Chief Director, Global Cooperation, IWS, DWS	1
Alternate (SA)	Chief Director, Engineering Services, IBOM, DWS	
Co-Chairperson (JP)	Chief Representative, JICA South Africa Office	1
The South African Side		
Project Director	Director, Technical Engineering Services, IBOM, DWS	1
Co-Project Director	Director: Water Sustainability and Innovations, SALGA	1
Project Manager (Operational)	Centre Manager, IBTC, DWS	1
Co-Project Manager (Technical)	Director, Water Use Efficiency, P&I, DWS	1
Member	Director, Official Development Assistance, IWS	1
Member	Director, Operational Support, PMU, DWS	1
Member	PMC Coordinator	1
The Japanese Side		
JICA Experts	Chief Advisor and Long-term Expert	2
JICA SA Office	Representative (concurrently serving as Co-Chairperson)	-
JICA Headquarters	Mission Team (Global Environment Department)	1
Observers		
Embassy of Japan	Representative	(1)
DIRCO	Representative	(1)
Municipalities / Water Boards	Representatives	(1)
EWSETA	Representative	(1)
LGSETA	Representative	(1)
Secretariats		
Secretariat	Training Manager, IBTC, DWS	1
Secretariat	Quality Assurer, IBTC, DWS	1
Secretariat	Staff, Water Use Efficiency, P&I, DWS	1
Total (excluding observers)		**15**

Remarks: The actual JCC meetings were attended by other DWS officials, JICA Experts and JICA South Africa Office officials.

Table 2-2 shows agenda and matters discussed in the JCC meetings (refer to Appendix 1 for Minutes of Meeting).

Table 2-2: Agenda and Matters discussed in JCC Meetings

Title	Date	Agenda and the Matters discussed	Participants
Kick-off	17 August 2017	a. Introduction of JICA Technical Cooperation Project. b. Outline of the Project. c. Presentation for project Implementation and approval d. Presentation for monitoring sheet (Ver.0) including PDM_1, PO_1 and approval. e. Confirmation of list of JCC members. f. Dedicated technical personnel for Training. g. Office space and facilities. h. Contents of training in Japan.	21
The 1st JCC	15 December 2017	a. Presentation of work plan and approval. b. Presentation of project monitoring (Ver.1) and approval. c. Presentation of practical tips on establishing training centre. d. Delay of baseline survey and countermeasure including extension of work period. e. Dedicated technical personnel for Training. f. Postpone of the 1st training in Japan to April 2018 from February 2018.	17
The 2nd JCC	25 July 2018	a. Presentation of project monitoring (Ver. 2) and approval, Report of Baseline survey, and Training in Japan. b. Delay of project and countermeasure (9 months extension of Phase 1) c. Presentation of concepts and contents and curriculum of the NRW training and approval. d. Revision of PDM_1 and PO_1 (PDM_2 and PO_2) and approval according to items b and c. e. Institutional collaboration with stakeholders to conduct the NRW Training (Facilitators and Workplaces) and importance of taking leadership of DWS. f. Dedicated technical personnel for Training. g. Project management. (Role of members, responsibility of task team, and working group)	20
The 3rd JCC	29 November 2018	a. Presentation of outline, progress, current issues, challenges, solutions and revision of plan of operation. b. Revision of project implementation structure, to improve governance and management of the project, communication, funding and monitoring and reporting. c. Delay in training development (selection of facilitators and the target participating municipalities. d. Revision of PO_2 (PO_3) and approval according to item c. e. Relation with new qualification: Water Reticulation Practitioner. f. Acceleration and sound implementation of the Project. g. DWS's budget and funding to the Project. (SETA fund) h. Involvement of stakeholders. (SALGA and CoGTA) i. Confirmation of draft business plan of the National NRW Training. j. Confirmation of draft design of the National NRW Training yard and equipment.	21
The 3rd JCC Follow-up	11 December 2018	a. Document describes all tasks/sub-tasks to improve management of the project. b. Delay in Training development (Selection of facilitators and the target participating municipalities) c. Follow up for new qualification: Water Reticulation Practitioner d. Follow up for DWS budget and SETA grant.	16

Title	Date	Agenda and the Matters discussed	Participants
The 4th JCC	12 March 2019	a. Presentation of project monitoring (Ver. 3) and approval b. Delay in activities/tasks (selection of facilitators and facilitator meeting and learning/teaching material development) c. Revision of PO_3 (PO_4) and approval according to item b. d. Rescheduling of the 2nd Training in Japan due to the general election 2019. e. DWS's budget and funding support f. Less collaboration with SALGA (a Pre-condition for the Project) g. Project Management and Operation h. Approval of the Business Plan of the National NRW Training	20
The 5th JCC	17 October 2019	a. Presentation of project monitoring (Ver. 4) and approval b. Delay in activities/tasks overall c. Revision of PO_4 (PO_5) and approval according to item b. d. Systematic and sustainable business plan e. Understanding and cooperation of relevant DWS's Branches/Chief-Directorates/Directorates and Stakeholders f. Project management and operation g. Steering Committee for the National NRW Training h. Accreditation preparation	23
-	26 March 2020	- The 6th JCC meeting was planned initially but postponed due to the first state of emergency against COVID-19 - Project monitoring sheet (Ver.5) was developed.	-
The 6th JCC	17 July 2020 (Online)	a. Presentation of project status report b. Objectives in project operations under the circumstances by COVID-19 c. Suspended existing activities and outstanding issues d. Direction and timeframe of project operation (scenarios comparison and necessary extension of the project duration) e. Conditions and considerations in project operation f. Recommendations of additional activities and inputs (for online system adaptation and sustainability plan) g. Remote assistance by JICA Experts h. Revision of PDM_2 and PO_5 (PDM_3 and PO_6) and approval according to items b to g. i. Endorsement of extension of the project duration	22
The 7th JCC	12 February 2021 (Online)	a. Presentation of project monitoring (Ver. 6) and approval b. Progress of activities/tasks overall c. Issues and challenges (Difficulty in conducting practices and workplace training of the 3rd group/intake in the project duration, and difficulty in extending the project duration) d. Recommendations by PMC e. High priority tasks f. Draft JICA's follow-up plan for the post-Project g. Draft sustainability plan including Steering Committee for the National NRW Training h. National NRW Programme and collaboration with a JICA Expert to DBSA i. Handover ceremony	23
The Final JCC	25 March 2021 (Online)	a. Presentation of project closing report b. Achievement of Outputs and Project Purpose c. Tasks to be followed up in the short-term period d. Sustainability plan of the National NRW Training e. JICA's follow-up plan for the post-Project f. The Minister's remarks in handover ceremony	20

2.5 Revision of Project Design Matrix (PDM)

As a result of project monitoring, Project Design Matrix (PDM) was reviewed, and its revisions were proposed by the Project Team (Project Management Committee: PMC) and approved in the JCC meetings.

PDM was revised twice: Version-1: PDM_1 to Version-2: PDM_2, Version-2: PDM_2 to Version-3: PDM_3. Table 2-3 and Table 2-4 show reasons of PDM revisions. Refer to Table 1 in the front pages for the latest Version-3: PDM_3.

2.6 Activities and Inputs in line with Plan of Operation (PO)

Likewise, as a result of project monitoring, Plan of Operation (PO) was also reviewed and revised.

Many activities were delayed compared to Version-1:PO_1 which was prepared in the beginning of the Project. Although the PO was reviewed/revised accordingly to complete the Project within the original project duration, COVID-19 global pandemic after March 2020 forced the suspension of some activities and inputs.

However, after extending the project duration and reviewing/revising the PO due to the decision to continue the existing activities, inputs and to add new activities and inputs related to online system adaptation, the Project completed all activities and inputs in accordance with the latest Version-6: PO_6 shown in Table 2 in the front pages. Details of achievement in activities and inputs are described in following Chapters.

2.7 Workshop and Seminar

To develop and promote the National NRW Training, the Project Team attended and convened workshops and seminars. Refer to Chapter 3.5 for details.

2.8 Circumstances by COVID-19 and Measures in South Africa

Figure 2-3 shows circumstances by COVID-19 and measures in South Africa since the first case of COVID-19 infection was confirmed in South Africa in a chronological order. The Project Team observed these situations carefully, carried out project operation, activities and inputs, and accomplished the Project in accordance with infection control guidelines against COVID-19.

- 1st March 2020: The first case confirmed of COVID-19 in South Africa
- 15th March 2020: Statement by President: Measures to combat COVID-19 Epidemic (National State of Disaster)
- 17th March 2020: JICA HQs' instruction to all JICA Experts worldwide for temporary return
- 22nd March 2020: All JICA Experts returned to Japan.
- 23rd March 2020: Statement by President on Escalation of Measures to combat the COVID-19 Epidemic
- 26th March 2020: National Lockdown for 21 days
- 9th April 2020: Extension of Lockdown to the end of April
- 23th April 2020: Statement by President on SA's Response to the COVID-19 Pandemic (Risk Adjusted Strategy)
- 1st May 2020: Relaxation of the Alert Level from 5 to 4 of Risk Adjusted Strategy
- 24th May 2020: Statement by President: Developments in Risk Adjusted Strategy
- 1st June 2020: Relaxation of the Alert Level from 4 to 3 of Risk Adjusted Strategy
- 17th June 2020: Address by President: SA's response to the COVID-19
- 25th June 2020: Restriction Ease of the current Alert Level 3 of Risk Adjusted Strategy
- 12th July 2020: Curfew (13th July -). Extension of National State of Disaster to 15th Aug.
- 15th August 2020: Statement by President: Peak-out and Extension of National State of Disaster to 15th Sep.
- 18th August 2020: Relaxation of the Alert Level from 3 to 2 of Risk Adjusted Strategy
- 14th September 2020: Statement by President: Extension of National State of Disaster to 15th Oct.
- 16th September 2020: Statement by President: SA's response to the COVID-19
- 21st September 2020: Relaxation of the Alert Level from 2 to 1 of Risk Adjusted Strategy
- 1st October 2020: Boarder Reopening and Resumption of International Commercial Flights
- 14th October 2020: Extension of the Alert Level 1 and National State of Disaster to 15th Nov.
- 12th November 2020: Admission into South Africa for all countires
- 14th November 2020: Extension of the Alert Level 1 and National State of Disaster to 15th Dec.
- 14th December 2020: Hotspots and additional restrictions in some Metros and areas
- 18th December 2021: Indentification of COVID-19 "501.V2 Variant"
- 28th December 2020: The adjusted Alert Level 3 and National State of Disaster to 15th Jan.
- 11th Jannuary 2021: Extension of the adjusted Alert Level 3 and National State of Disaster to 15th Feb.
- 1st February 2021: Extension of the Alert Level 3 and National State of Disaster to 15th Mar.
- Early February 2021: A few JICA Experts returned to South Africa.
- 12th February 2021: Statement by President
- 28th February 2021: Relaxation of the Alert Level from 3 to 1 of Risk Adjusted Strategy
- 31st March 2021: Completion of the Project activities in South Africa
- Early April 2021: All JICA Experts returned to Japan.

Figure 2-3: COVID-19 Circumstances in South Africa

Table 2-3: Reasons of Revision from PDM_1 to PDM_2 (1/5)

PDM Ver.1	PDM Ver.2	Reason for Revision
Project Title	**Project Title**	
Project for Strengthening the Training Capacity of IBTC on Non-Revenue Water in Republic of South Africa	Project for Strengthening the Training Capacity of IBTC on Non-Revenue Water in Republic of South Africa	(No change)
Project Period	**Project Period**	
August 2017 to July 2020 (36 months)	August 2017 to July 2020 (36 months)	(No change)
Implementing Organization	**Implementing Organization**	
Department of Water and Sanitation (DWS) / IBTC	Department of Water and Sanitation (DWS) / IBTC	(No change)
Dicrect Beneficiaries	**Dicrect Beneficiaries**	
DWS, IBTC and its personnel, Facilitators selected	DWS, IBTC and its personnel, Facilitators selected	(No change)
Indirect Beneficiaries	**Indirect Beneficiaries**	
Municipalities	Municipalities	(No change)
End Beneficiaries	**End Beneficiaries**	
Customers/Consumers of water supplied by Municipalities	Customers/Consumers of water supplied by Municipalities	(No change)
Project Site	**Project Site**	
Gauteng Province	Gauteng Province	(No change)
Overall Goal	**Overall Goal**	
Non-Revenue Water (NRW) skills development for Municipalities are continuously conducted under the IBTC's direction in collaboration with SALGA.	Non-Revenue Water (NRW) management skills are utilized in NRW reduction projects of participating municipalities.	To set the Overall Goal as an extension of the following Project Purpose which makes the NRW Training problem-solving-oriented (with quick field impacts) against NRW in municipalities in accordance with baseline survey results, and through discussions about training programme among the Project Team.
Objectively Verifiable Indicators	**Objectively Verifiable Indicators**	
1. Actual trainings in IBTC (No. of trainings / trades or skills) 2. IBTC organization/individual performance (degree/status) 3. Programmes planned in Strategic Business Model (trades or skills) 4. Actual trainings of NRW in Municipalities (No. of training)	1. NRW reduction projects using developed NRW management skills in participating municipalities are increased. 2. NRW ratio in participating municipalities is decreased.	To conform to the reason for revision of the Overall Goal.
Means of Verification	**Means of Verification**	
1&4. Annual Training Report 2. Capacity Assessment Report 3. IBTC Strategic Business Model	1. Monitoring report of participating municipalities 2. DWS's No-Drop report and/or report from participating municipalities	To conform to the reason for revision of the Overall Goal.
Important Assumption	**Important Assumption**	
		(No change)
Project Purpose	**Project Purpose**	
NRW Skills Programme is continuously provided at IBTC, based on organizational and technical needs.	NRW management skills are developed for participating municipalities through the NRW Training by IBTC.	To set the Project Purpose which makes the NRW Training problem-solving-oriented (with quick field impact) against NRW in municipalities in accordance with baseline survey results, and through discussions about training programme among the Project Team, and supposing that IBTC is capable of providing the NRW Training.
Objectively Verifiable Indicators	**Objectively Verifiable Indicators**	
1. Actual trainings (No. of trainings / trades or skills) 2. IBTC organization/individual performance / capacity 3. Programmes planned in Strategic Business Model (trades or skills) 4. Status of accreditation of NRW Unit Standards applied to SETA	1. No. of the NRW Training at IBTC is increased. 2. No. of water balance submission is increased. 3. No. of NRW reduction plan in participating municipalities is increased.	To conform to the reason for revision of the Project Purpose, and make indicators concrete in accordance with baseline survey results.

Table 2-3: Reasons of Revision from PDM_1 to PDM_2 (2/5)

PDM Ver.1	PDM Ver.2	Reason for Revision
Means of Verification	**Means of Verification**	
1. Annual Training Report 2. Capacity Assessment Report 3. IBTC Strategic Business Model 4. SETA Accreditation Certificate	1. IBTC's annual training report 2&3. DWS's No-Drop report and/or report from participating municipalities	To conform to the reason for revision of the Project Purpose, furthermore to make indicators concrete in accordance with baseline survey results.
Important Assumption	**Important Assumption**	
-Dramatic reduction of budget and public grants on skills development for Municipalities does not happen.	- Dramatic reduction of budget and public grants on skills development for Municipalities does not happen.	(No change)
Output 1	**Output 1**	
Training information on water supply sector is accumulated at IBTC and shared with SALGA and Municipalities.	Skill development, status-quo and challenges of NRW, and needs in municipalities are analyzed and shared with stakeholders.	To focus on the survey targets and actiities in accordance with state, capacity and roles of DWS/IBTC, furthermore not to specify SALGA only as an information hub.
Objectively Verifiable Indicators	**Objectively Verifiable Indicators**	
1-1. List of training resources (by providers, programmes, human resources, manuals, subsidies/grants, etc.) 1-2. Benchmarked matrix (summary) of Japan and South Africa on water services (comparative features, strength/weakness, methodology, etc.)	1-1. Analyzed/organized information of skills development of municipalities is submitted to DWS (list of no. of staff, attended training, mentor resources, training providers, manuals, workshops and yards, subsidies/grants, good practices, etc.) 1-2. Analyzed/organized information of NRW and needs of municipalities is submitted to DWS. 1-3. Benchmarked matrix of Japan and South Africa on water services is submitted to DWS (comparative feature strength/weakness, methodology, etc.) 1-4. Information sharing occasions are provided.	To conform to the reason for revision of the Output 1, and make indicators concrete in accordance with baseline survey results, furthermore to change terms.
Means of Verification	**Means of Verification**	
1-1. Baseline Survey Report 1-2. Benchmark Report	1-1&2. Baseline survey report and training curriculum 1-3. Benchmark report 1-4. Seminar report and presentations	To conform to the reason for revision of the Output 1, and make indicators concrete in accordance with baseline survey results, furthermore to change terms.
Important Assumption	**Important Assumption**	
		(No change)
Output 2	**Output 2**	
IBTC's training management capacity in water supply sector is improved.	IBTC's NRW Training capacity is improved.	To specify the target of the Project (focus on the NRW Training) in accordance with baseline survey results, state and capacity of DWS/IBTC, and through discussions among the Project Team.
Objectively Verifiable Indicators	**Objectively Verifiable Indicators**	
2-1. IBTC organization/individual performance / capacity 2-2. Progress of Organizational setting update 2-3. Record of SOPs (actual revisions) 2-4. Progress of update of IBTC Strategic Business Model	2-1. Appropriate organizational structure for the NRW Training is established at IBTC. 2-2. No. of revision of Standard Operation Procedures (SOP) of the NRW Training is increased. 2-3. No. of revision of the NRW Training Business Plan is increased.	To conform to the reason for revision of the Output 2, and change terms.
Means of Verification	**Means of Verification**	
2-1. Capacity Assessment Report 2-2. Proposed Organogram of IBTC 2-3. Standard Operating Procedure (SOP) 2-4. Draft revised IBTC Strategic Business Model	2-1. Capacity assessment report and/or organogram of IBTC 2-2. Standard Operation Procedures (SOP) of the NRW Training 2-3. The NRW Training Business Plan	To conform to the reason for revision of the Output 2, and change terms.
Important Assumption	**Important Assumption**	
		(No change)

Table 2-3: Reasons of Revision from PDM_1 to PDM_2 (3/5)

PDM Ver.1	PDM Ver.2	Reason for Revision
Output 3	**Output 3**	
Trainings on Non-Revenue Water (NRW) are conducted at IBTC.	The NRW Training is conducted with training improvement cycle.	To add terms for emphasising sustainability of the NRW Training, and delete "at IBTC" bacause training will be conducted at not only IBTC (knowledge, practices) but also workplaces.
Objectively Verifiable Indicators	**Objectively Verifiable Indicators**	
3-1. Actual trainings on NRW Skills Programme (No. of trainings, trainees) 3-2. Appropriateness of NRW Skills Programme (trainees' evaluation) 3-3 Feed back / utilization of skills trained at IBTC into the water services at sampled Municipality(ies)	3-1. No. of Facilitator Technical Meeting is increased. 3-2. No. of NRW Training is increased. 3-3. Trainee's satisfaction with the NRW Training is increased. 3-4. No. of feedback/utilization of skills trained into water services at municipalities is increased.	To conform to the reason for revision of the Output 3, and change terms.
Means of Verification	**Means of Verification**	
3-1. IBTC Annual Report 3-2. Training evaluation questionnaire to trainees 3-3. Survey report in sampled Municipality(ies)	3-1&2. IBTC annual report 3-3. Training evaluation questionnaire to trainees (training management/contents and individual achievement) 3-4. Survey of participating municipalities	To conform to the reason for revision of the Output 3, and change terms.
Important Assumption	**Important Assumption**	
		(No change)
Activities for Output 1	**Activities for Output 1**	
Activity 1-1	**Activity 1-1**	
Conduct baseline survey on Skills Development in water supply sector (programme, human resources, materials and management).	Conduct baseline survey on skills development and NRW in municipalities.	To clarify the target of the Project.
Activity 1-2	**Activity 1-2**	
Compile and analyze training resources, good practices, lessons learnt in water supply sector.	Compile and analyze skills development and NRW in municipalities.	To clarify the target of the Project.
Activity 1-3		
Share training resources, good practices, lessons learnt with SALGA and Municipalities.		To incorporate this activity into the similar activity (Activity 1-5 of PDM_2).
	Activity 1-3	
	Review needs of skills development on NRW, existing qualifications, roles and responsibility of DWS/IBTC.	To move/incorporate similar activities (Activity 2-1, 3-1 and 3-2 of PDM_1). Into this activity.
Activity 1-4		
Incorporate good practices into training materials.		To incorporate this activity into the similar activity (Activity 3-7 of PDM_2).
Activity 1-5	**Activity 1-4**	
Benchmark water supply services and its skills development in Japan.	Benchmark water supply services and its skills development in Japan.	(No change)
Activity 1-6	**Activity 1-5**	
Hold a seminar on the result of the baseline survey and benchmark.	Hold a seminar and share on the results of the baseline survey and benchmark with stakeholders.	To incorporate the similar activity (Activity 1-3 of PDM_1) in to this activity.
Activities for Output 2	**Activities for Output 2**	
Activity 2-1		
Review roles and responsibility of IBTC for skills development of Municipalities in water supply sector based on the results of Output-1.		To incorporate this activity into the Activity 1-3 of PDM_2. as a activty for Output 1.
Activity 2-2	**Activity 2-1**	
Draft proposed organogram of IBTC including NRW Training Section.	Prepare the NRW Training Business Plan.	To clarify the target of the Project.
	Activity 2-2	
	Prepare and take procedures for funding the NRW Training.	To specify an activity for funding the training.

Table 2-3: Reasons of Revision from PDM_1 to PDM_2 (4/5)

PDM Ver.1	PDM Ver.2	Reason for Revision
Activity 2-3	**Activity 2-3**	
Prepare Terms of Reference for Training Sections related to skills development in water supply sector.	Prepare Terms of Reference for the NRW Training.	To focus on the NRW Training in accordance with resources and capacity of DWS/IBTC, and change terms.
Activity 2-4	**Activity 2-4**	
Prepare draft Standard Operating Procedures (SOP) of skills development provision.	Prepare Standard Operation Procedures (SOP) of the NRW Training.	To focus on the NRW Training in accordance with resources and capacity of DWS/IBTC, and change terms.
Activity 2-5	**Activity 2-5**	
Revise the SOP through the activities of Output-3.	Revise the SOP of the NRW Training through the activities of Output-3.	To focus on the NRW Training in accordance with resources and capacity of DWS/IBTC, and change terms.
Activity 2-6	**Activity 2-6**	
Draft revised IBTC Strategic Business Model.	Revise the NRW Training Business Plan through the activities of Output-3.	To focus on the NRW Training in accordance with resources and capacity of DWS/IBTC, and change terms.
Activity 2-7	**Activity 2-7**	
Conduct capacity assessment of IBTC's organization, individuals and facilitators developed.	Conduct capacity assessment of IBTC.	To change terms because assessment of individuals and facilitators won't be necessarily effective (they have capacity at a certain level).
Activities for Output 3	**Activities for Output 3**	
Activity 3-1		
Review situation/needs of skills development on NRW from the results of baseline survey of Activity 1-1.		To incorporate this activity into the Activity 1-3 of PDM_2 as a activty for Output 1.
Activity 3-2		
Select registered Unit Standards related to NRW from existing qualifications of SAQA.		To incorporate this activity into the Activity 1-3 of PDM_2 as a activty for Output 1.
Activity 3-3	**Activity 3-1**	
Design NRW Skills Programme consisting of the selected Unit Standards and supplementary items if any.	Design the NRW Training based on the results of Output-1.	To make the NRW Training problem-solving-oriented (not accreditation-oriented) in accordance with baseline survey results, and through discussions about training programme among the Project Team.
	Activity 3-2	
	Secure the site(s) for workplace of the NRW Training.	To specify an activity for securing workplace in accordance with baseline survey results, particularly training components (knowlede, practice and workplace) by QCTO.
Activity 3-4	**Activity 3-3**	
Select facilitators (qualified/skilled artisans on water reticulation or equivalent) for NRW Skills Programme from Municipalities and IBTC (DWS).	Secure facilitators (experienced/skilled personnel on water reticulation or equivalent) for the NRW Training from DWS/IBTC and stakeholders.	To recruit facilitators from not only DWS/IBTC and municipalities but also other organizations in accordance with baseline survey results.
Activity 3-5		
Schedule Training of Trainer (facilitator) (TOT), Assessors and Moderators for NRW Skills Programme at IBTC.		To incorporate this activity into the similar activity (Activity 3-7 of PDM2).
Activity 3-6	**Activity 3-4**	
Develop training yard for NRW Skills Programme at IBTC.	Develop training yard for the NRW Training at IBTC.	To change terms.
Activity 3-7	**Activity 3-5**	
Procure equipment, instruments/tools and materials for NRW Skills Programme at IBTC.	Procure equipment, instruments/tools and materials for the NRW Training.	To change terms, and delete "at IBTC" bacause training will be conducted at not only IBTC (knowledge, practices) but also workplaces.
Activity 3-8	**Activity 3-6**	
Develop training/learning materials for NRW Skills Programme at IBTC.	Develop teaching/learning materials for the NRW Training with incorporating good practices from baseline survey into the materials if any.	To change terms, and incorporate the similar activity (Activity 1-4 of PDM_1) into this activity.

Table 2-3: Reasons of Revision from PDM_1 to PDM_2 (5/5)

PDM Ver.1	PDM Ver.2	Reason for Revision
Activity 3-9	**Activity 3-7**	
Conduct TOT by both JICA Experts and South African Facilitators for NRW Skills Programme at IBTC.	Prepare and conduct Facilitator Technical Meetings by both facilitators and JICA Experts for the NRW Training.	To replace TOT (from the beginning) by interactive sessions with skilled/experienced candidates to be nominated in accordance with baseline survey results and in view of time shortening, furthermore to change terms and incorporate the similar activity (Activity 3-5 of PDM_1) into this activity.
Activity 3-10	**Activity 3-8**	
Develop NRW Skills Programme as an accredited programme by SETA. a) Apply for registration of facilitators of NRW Skills Programme as assessor/moderator/facilitator from SETA. b) Prepare Quality Management System of NRW Skills Programme at IBTC. c) Apply for accreditation of NRW Skills Programme to SETA.	Prepare for conducting the NRW Training (schedule, budget plan, applying for releasing fund, recruiting participants and etc.).	To make the NRW Training problem-solving-oriented (with quick field impact) against NRW in municipalities, not persisting in accreditation of the NRW Training but developing/improving the NRW Training with outcomes and achievements in the project, furthermore to change terms and incorporate the similar activities (Activity 3-11 and 3-12 of PDM_1) into this activity.
Activity 3-11		
Prepare Annual Plan of NRW Skills Programme including budget plan at IBTC.		To incorporate this activity into the similar activity (Activity 3-8 of PDM_2).
Activity 3-12		
Recruit participants from Municipalities through SALGA for NRW Skills Programme at IBTC.		To incorporate this activity into the similar activity (Activity 3-8 of PDM_2).
Activity 3-13	**Activity 3-9**	
Conduct trainings by South African Facilitators for NRW Skills Programme at IBTC.	Conduct the NRW Training by facilitators with support from JICA Experts.	To change terms.
Activity 3-14	**Activity 3-10**	
Monitor implementation of NRW Skills Programme and feed the results back into Annual Plan and Programme.	Monitor the NRW Training and feed the results back under training improvement cycle.	To change terms.
Activity 3-15	**Activity 3-11**	
Verify effects of NRW Skills Programme and provide necessary support by JICA Experts and IBTC in sampled Municipality(ies) if any.	Verify effects of the NRW Training in sampled municipalities.	To change terms.

Table 2-4: Reasons of Revision from PDM_2 to PDM_3 (1/5)

PDM Ver.2	PDM Ver.3	Reason for Revision
Project Title	**Project Title**	
Project for Strengthening the Training Capacity of IBTC on Non-Revenue Water in Republic of South Africa	Project for Strengthening the Training Capacity of IBTC on Non-Revenue Water in Republic of South Africa	(No change)
Project Period	**Project Period**	
August 2017 to July 2020 (36 months)	August 2017 to March 2021 (44 months)	To extend the Project Period in order to carry on, upgrade the Project and keep aiming at achievements of the Project Purpose and Outputs by conducting the National NRW Training for the 3rd group/intake under the circumstances by COVID-19.
Implementing Organization	**Implementing Organization**	
Department of Water and Sanitation (DWS) / IBTC	Department of Water and Sanitation (DWS) / IBTC, South African Local Government Association (SALGA)	To state SALGA that was supposed be included.
Dicrect Beneficiaries	**Dicrect Beneficiaries**	
DWS, IBTC and its personnel, Facilitators selected	DWS, IBTC and its personnel, Facilitators selected	(No change)
Indirect Beneficiaries	**Indirect Beneficiaries**	
Municipalities	Municipalities	(No change)
End Beneficiaries	**End Beneficiaries**	
Customers/Consumers of water supplied by Municipalities	Customers/Consumers of water supplied by Municipalities	(No change)
Project Site	**Project Site**	
Gauteng Province	Gauteng Province and all other Provinces	To specify locations targeted by the National NRW Training (municipalities as Water Services Authority nationwide)
Overall Goal	**Overall Goal**	
Non-Revenue Water (NRW) management skills are utilized in NRW reduction projects of participating municipalities.	Non-Revenue Water (NRW) management skills are utilized in participating municipalities under the established National NRW Training system.	To restate the Overall Goal by emphasising the National NRW Training system to be established by the Project, furthermore not limit to NRW reduction projects. (NRW management skills includes skills and knowledge about NRW and reticulation basics as well as the created outcomes.)
Objectively Verifiable Indicators	**Objectively Verifiable Indicators**	
1. NRW reduction projects using developed NRW management skills in participating municipalities are increased. 2. NRW ratio in participating municipalities is decreased.	1. No. of confirmed DMAs in participating municipalities is increased. 2. Any actions in NRW-related aspects are initiated in participating municipalities. 3. No. of the National NRW Trainings conducted with facilitators is increased as scheduled in annual programme (at least, three times a year). 4. No. of Business plan, SOP, teaching/ learning materials are revised periodically (at least, biennially). 5. Participating municipalities are monitored and followed up regularly. 6. Steering committee meeting is held regularly (at least, annually).	To specify them more. 1. (i.e.) Zone configuration, step test, billing data analysis and water balance 2. (Ex.) Mapping revision, meter installation/replacement/audit, preventive maintenance, etc.; these should be captured and monitored continuously by DWS.
Means of Verification	**Means of Verification**	
1. Monitoring report of participating municipalities 2. DWS's No-Drop report and/or report from participating municipalities	1&2. Monitoring/follow-up results of participating municipalities 3&4. IBTC's training reports 5. Monitoring/follow-up results of participating municipalities 6. Minutes of meeting of steering committee	To specify them according to revision in the above indicators.
Important Assumption	**Important Assumption**	
		(No change)
Project Purpose	**Project Purpose**	
NRW management skills are developed for participating municipalities through the NRW Training by IBTC.	NRW management skills are developed for participating municipalities through the National NRW Training by IBTC.	To specify "National". (NRW management skills includes skills and knowledge about NRW and reticulation basics as well as the created outcomes.)

Table 2-4: Reasons of Revision from PDM_2 to PDM_3 (2/5)

PDM Ver.2	PDM Ver.3	Reason for Revision
Objectively Verifiable Indicators	**Objectively Verifiable Indicators**	
1. No. of the NRW Training at IBTC is increased. 2. No. of water balance submission is increased. 3. No. of NRW reduction plan in participating municipalities is increased.	1. No. of the National NRW Training is increased (three times or more). 2. No. of pilot DMAs for problem solution is increased (11 or more). 3. No. of facilitators is increased (adequate resources to conduct the Training: 16 or more). 4. No. of learners is increased (44 or more from 11 participating municipalities and others). 5. No. of debrief reports as outcomes are prepared (11 or more). 6. Learners' satisfaction scales are kept high or increased. 7. Steering committee kick-off meeting is held. 8. Business plan, SOP, teaching/learning materials, committee TOR are finalized as Version-1.	To specify them more.
Means of Verification	**Means of Verification**	
1. IBTC's annual training report 2&3. DWS's No-Drop report and/or report from participating municipalities	All. IBTC's training reports All. Other relevant documents	To specify them according to revision in the above indicators.
Important Assumption	**Important Assumption**	
- Dramatic reduction of budget and public grants on skills development for Municipalities does not happen.	- Dramatic reduction of budget and public grants on skills development for Municipalities does not happen.	(No change)
Output 1	**Output 1**	
Skill development, status-quo and challenges of NRW, and needs in municipalities are analyzed and shared with stakeholders.	Skill development, status-quo and challenges of NRW, and needs in municipalities are analyzed and shared with stakeholders.	(No change)
Objectively Verifiable Indicators	**Objectively Verifiable Indicators**	
1-1. Analyzed/organized information of skills development of municipalities is submitted to DWS (list of no. of staff, attended training, mentor resources, training providers, manuals, workshops and yards, subsidies/grants, good practices, etc.) 1-2. Analyzed/organized information of NRW and needs of municipalities is submitted to DWS. 1-3. Benchmarked matrix of Japan and South Africa on water services is submitted to DWS (comparative feature strength/weakness, methodology, etc.) 1-4. Information sharing occasions are provided.	1-1. Analyzed/organized information of skills development of municipalities is submitted to DWS (list of no. of staff, attended training, mentor resources, training providers, manuals, workshops and yards, subsidies/grants, good practices, etc.) 1-2. Analyzed/organized information of NRW and needs of municipalities is submitted to DWS. 1-3. Benchmarked matrix of Japan and South Africa on water services is submitted to DWS (comparative feature strength/weakness, methodology, etc.) 1-4. Information sharing occasions are provided.	(No change)
Means of Verification	**Means of Verification**	
1-1&2. Baseline survey report and training curriculum 1-3. Benchmark report 1-4. Seminar report and presentations	1-1&2. Baseline survey report and training curriculum 1-3. Benchmark report 1-4. Seminar report and presentations	(No change)
Important Assumption	**Important Assumption**	
		(No change)
Output 2	**Output 2**	
IBTC's NRW Training capacity is improved.	IBTC's National NRW Training capacity is improved.	To specify "National".

Table 2-4: Reasons of Revision from PDM_2 to PDM_3 (3/5)

PDM Ver.2	PDM Ver.3	Reason for Revision
Objectively Verifiable Indicators	**Objectively Verifiable Indicators**	
2-1. Appropriate organizational structure for the NRW Training is established at IBTC. 2-2. No. of revision of Standard Operation Procedures (SOP) of the NRW Training is increased. 2-3. No. of revision of the NRW Training Business Plan is increased.	2-1. Appropriate organizational structure for the National NRW Training is established at IBTC. 2-2. No. of revision of Standard Operation Procedures (SOP) of the National NRW Training is increased. 2-3. No. of revision of the National NRW Training Business Plan is increased. 2-4. Sustainability plans including steering committee or equivalent for the National NRW Training are finalized.	To specify "National" and sustainability plan.
Means of Verification	**Means of Verification**	
2-1. Capacity assessment report and/or organogram of IBTC 2-2. Standard Operation Procedures (SOP) of the NRW Training 2-3. The NRW Training Business Plan	2-1. Capacity assessment report and/or organogram of IBTC (including IT environment) 2-2. Standard Operation Procedures (SOP) of the National NRW Training 2-3. The National NRW Training Business Plan 2-4. Next year's annual programme, TOR of steering committee or equivalent, etc.	To specify them according to revision in the above indicators.
Important Assumption	**Important Assumption**	
		(No change)
Output 3	**Output 3**	
The NRW Training is conducted with training improvement cycle.	The National NRW Training is conducted with training improvement cycle.	To specify "National".
Objectively Verifiable Indicators	**Objectively Verifiable Indicators**	
3-1. No. of Facilitator Technical Meeting is increased. 3-2. No. of NRW Training is increased. 3-3. Trainee's satisfaction with the NRW Training is increased. 3-4. No. of feedback/utilization of skills trained into water services at municipalities is increased.	3-1. No. of Facilitator Technical Meeting is increased. (both physical and online basis) 3-2. No. of the National NRW Training is increased. (both physical and online basis) 3-3. Learners' satisfaction scales are kept high or increased. 3-4. Feedback/utilization of skills, knowledge and outcomes into water services of participating municipalities is increased.	To specify "National" and consider online system adaptation.
Means of Verification	**Means of Verification**	
3-1&2. IBTC annual report 3-3. Training evaluation questionnaire to trainees (training management/contents and individual achievement) 3-4. Survey of participating municipalities in sampled municipalities	3-1&2. IBTC's reports 3-3. Training evaluation questionnaire 3-4. Debriefing reports by learners and/or monitoring/follow-up results	To specify them according to revision in the above indicators.
Important Assumption	**Important Assumption**	
		(No change)
Activities for Output 1	**Activities for Output 1**	
Activity 1-1	**Activity 1-1**	
Conduct baseline survey on skills development and NRW in municipalities.	Conduct baseline survey on skills development and NRW in municipalities.	(No change)
Activity 1-2	**Activity 1-2**	
Compile and analyze skills development and NRW in municipalities.	Compile and analyze skills development and NRW in municipalities.	(No change)
Activity 1-3	**Activity 1-3**	
Review needs of skills development on NRW, existing qualifications, roles and responsibility of DWS/IBTC.	Review needs of skills development on NRW, existing qualifications, roles and responsibility of DWS/IBTC.	(No change)
Activity 1-4	**Activity 1-4**	
Benchmark water supply services and its skills development in Japan.	Benchmark water supply services and its skills development in Japan.	(No change)

Table 2-4: Reasons of Revision from PDM_2 to PDM_3 (4/5)

PDM Ver.2	PDM Ver.3	Reason for Revision
Activity 1-5	**Activity 1-5**	
Hold a seminar and share on the results of the baseline survey and benchmark with stakeholders.	Hold a seminar and share on the results of the baseline survey and benchmark with stakeholders.	(No change)
Activities for Output 2	**Activities for Output 2**	
Activity 2-1	**Activity 2-1**	
Prepare the NRW Training Business Plan.	Prepare the National NRW Training Business Plan.	To specify "National".
Activity 2-2	**Activity 2-2**	
Prepare and take procedures for funding the NRW Training.	Prepare and take procedures for funding the National NRW Training.	To specify "National".
Activity 2-3	**Activity 2-3**	
Prepare Terms of Reference for the NRW Training.	Prepare Terms of Reference for the National NRW Training.	To specify "National".
Activity 2-4	**Activity 2-4**	
Prepare Standard Operation Procedures (SOP) of the NRW Training.	Prepare Standard Operation Procedures (SOP) of the National NRW Training.	To specify "National".
Activity 2-5	**Activity 2-5**	
Revise the SOP of the NRW Training through the activities of Output-3.	Revise the SOP of the National NRW Training through the activities of Output-3.	To specify "National".
Activity 2-6	**Activity 2-6**	
Revise the NRW Training Business Plan through the activities of Output-3.	Revise the National NRW Training Business Plan through the activities of Output-3.	To specify "National".
Activity 2-7	**Activity 2-7**	
Conduct capacity assessment of IBTC.	Conduct capacity assessment of IBTC.	(No change)
	Activity 2-8	
	Review and enhance IT environment for online system adaptation in accordance with the activities of Output-3.	To conduct the National NRW Training for the 3rd grroup/intake by online system under the circumstances by COVID-19.
	Activity 2-9	
	Develop sustainability plans for the National NRW Training.	To specify an activity for sustainability plan.
Activities for Output 3	**Activities for Output 3**	
Activity 3-1	**Activity 3-1**	
Design the NRW Training based on the results of Output-1.	Design the National NRW Training based on the results of Output-1.	To specify "National".
Activity 3-2	**Activity 3-2**	
Secure the site(s) for workplace of the NRW Training.	Secure the participating municipalities and site(s) for workplace of the National NRW Training.	To specify "National" and "participating municipalities".
Activity 3-3	**Activity 3-3**	
Secure facilitators (experienced/skilled personnel on water reticulation or equivalent) for the NRW Training from DWS/IBTC and stakeholders.	Secure facilitators (experienced/skilled personnel on water reticulation or equivalent) for the National NRW Training from DWS/IBTC and stakeholders.	To specify "National".
Activity 3-4	**Activity 3-4**	
Develop training yard for the NRW Training at IBTC.	Develop training yard for the National NRW Training at IBTC.	To specify "National".
Activity 3-5	**Activity 3-5**	
Procure equipment, instruments/tools and materials for the NRW Training.	Procure equipment, instruments/tools and materials for the National NRW Training.	To specify "National".
Activity 3-6	**Activity 3-6**	
Develop teaching/learning materials for the NRW Training with incorporating good practices from baseline survey into the materials if any.	Develop teaching/learning materials for the National NRW Training with incorporating good practices from baseline survey into the materials if any.	To specify "National".
Activity 3-7	**Activity 3-7**	
Prepare and conduct Facilitator Technical Meetings by both facilitators and JICA Experts for the NRW Training.	Prepare and conduct Facilitator Technical Meetings by both facilitators and JICA Experts for the National NRW Training.	To specify "National".

Table 2-4: Reasons of Revision from PDM_2 to PDM_3 (5/5)

PDM Ver.2	PDM Ver.3	Reason for Revision
Activity 3-8	**Activity 3-8**	
Prepare for conducting the NRW Training (schedule, budget plan, applying for releasing fund, recruiting participants and etc.).	Prepare for conducting the National NRW Training (schedule, budget plan, applying for releasing fund, recruiting participants and etc.).	To specify "National".
Activity 3-9	**Activity 3-9**	
Conduct the NRW Training by facilitators with support from JICA Experts.	Conduct the National NRW Training by facilitators with support from JICA Experts.	To specify "National".
Activity 3-10	**Activity 3-10**	
Monitor the NRW Training and feed the results back under training improvement cycle.	Monitor the National NRW Training and feed the results back under training improvement cycle.	To specify "National".
Activity 3-11	**Activity 3-11**	
Verify effects of the NRW Training in sampled municipalities.	Verify effects of the National NRW Training in sampled municipalities.	To specify "National".
	Activity 3-12	
	Assess the feasibility and sustainability of online system adaptation into the National NRW Training.	To conduct the National NRW Training for the 3rd grroup/intake by online system under the circumstances by COVID-19.
	Activity 3-13	
	Review, revise or upgrade the programme/curriculum, and develop new form and ways of the National NRW Training with online system adaptation.	To conduct the National NRW Training for the 3rd grroup/intake by online system under the circumstances by COVID-19.
	Activity 3-14	
	Review, revise or upgrade learning/teaching materials and tools for online system adaptation.	To conduct the National NRW Training for the 3rd grroup/intake by online system under the circumstances by COVID-19.
	Activity 3-15	
	Procure additional services, equipment, instruments/tools and materials for online system adaptation.	To conduct the National NRW Training for the 3rd grroup/intake by online system under the circumstances by COVID-19.

Chapter 3 Activities for Output 1 "Skill development, status-quo and challenges of NRW, and needs in municipalities are analyzed and shared with stakeholders."

3.1 Activity 1-1: Conduct baseline survey on skills development and NRW in municipalities.

(1) Outline of Baseline Survey

Table 3-1 shows outlines of the baseline survey.

Table 3-1: Outline of Baseline Survey

Survey Period:	October 2017 to March 2018 (Originally, to December 2017)
Survey Method:	Interview and/or questionnaire, collection of the existing documents and reports
WSA targeted for survey:	Interview and questionnaire: 44 municipalities (WSAs) and 7 Water Boards Only questionnaire: The remaining municipalities (WSAs)
Ratio of Answers:	Total 26 (51%= 26 / (44+7))

Source: Project Team

(2) Selection Criteria of Municipalities (WSA) targeted for conducting Baseline Survey

Based on the following selection criteria, the Project selected municipalities (Water Services Authority: WSA) and Water Boards as described below through the discussion with DWS and SALGA.

Selection Criteria for Municipalities (WSA) targeted for conducting Baseline Survey

- All metro municipalities and at least 30 municipalities
- At least two to four municipalities in each Province
- The municipalities which have Water Conservation / Water Demand Management (WCWDM), sections in charge of NRW, NRW activities, strategy and plans
- Cooperative municipalities to DWS and SALGA
- Municipalities to be expected for appointing facilitators and learners
- High and low grade municipalities in service performance and/or capacity
- Objectively-selection in principle and intentionally-selection if necessary

Finally, DWS and SALGA judges from the particular aspects such as scale of municipalities (WSAs), politics and geographical feature.

(3) Organizations targeted for the Baseline Survey

Table 3-2, Figure 3-1 and Figure 3-2 show the organizations targeted for the baseline survey.

Table 3-2: Organizations targeted for the Baseline Survey

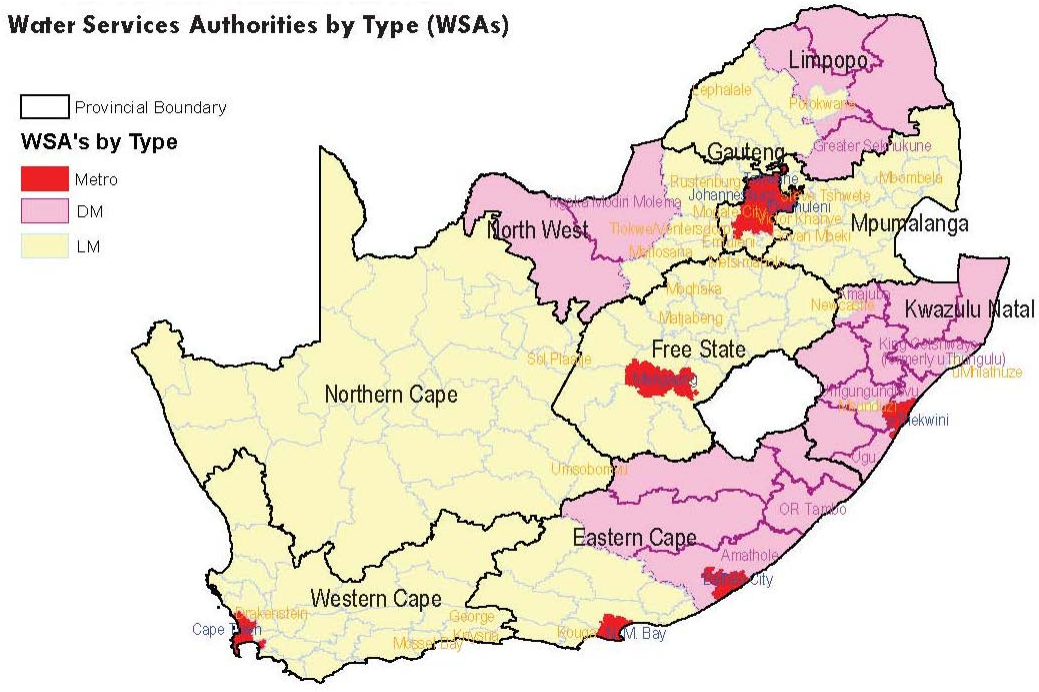
No	Prov.	Name	Municipality		Visit
			Type	Classification	
Municipality (Water Services Authority: WSA)					
1	EC	Amathole	DM	C2	Visit
2	EC	Buffalo City	Metro	A	Visit
3	EC	Kouga	LM	B3	Visit
4	EC	Nelson Mandela Bay	Metro	A	Visit
5	EC	OR Tambo	DM	C2	Visit
6	FS	Mangaung	Metro	A	Visit
7	FS	Matjabeng	LM	B1	Visit
8	FS	Metsimaholo	LM	B2	Visit
9	FS	Moqhaka	LM	B2	Visit
10	GP	City of Johannesburg	Metro	A	Visit
11	GP	City of Tshwane	Metro	A	Visit
12	GP	Ekurhuleni	Metro	A	Visit
13	GP	Emfuleni	LM	B1	Visit
14	GP	Mogale City	LM	B1	Visit
15	KZN	Amajuba	DM	C2	Joint Meeting
16	KZN	eThekwini	Metro	A	Visit
17	KZN	Msunduzi	LM	B1	Joint Meeting
18	KZN	Newcastle	LM	B1	Joint Meeting
19	KZN	Ugu	DM	C2	Visit
20	KZN	uMgungundlovu	DM	C2	Joint Meeting
21	KZN	uMhlathuze	LM	B1	Joint Meeting
22	KZN	King Cetshwayo (formerly uThungulu)	DM	C2	Joint Meeting
23	LP	Sekhukhune	DM	C2	Visit
24	LP	Lephalale	LM	B3	Visit
25	LP	Polokwane	LM	B1	Visit
26	MP	Govan Mbeki	LM	B1	Visit
27	MP	Mbombela	LM	B1	Visit
28	MP	Steve Tshwete	LM	B1	Visit
29	MP	Victor Khanye	LM	B3	Visit
30	NC	Sol Plaatje	LM	B1	Visit
31	NC	Umsobomvu	LM	B3	Visit
32	NW	Ngaka Modiri Molema	DM	C2	Visit
33	NW	Matlosana	LM	B1	Visit
34	NW	Rustenburg	LM	B1	Visit
35	NW	JB Marks (formerly Tlokwe and Ventersdorp)	LM	B1	Visit
36	WC	City of Cape Town	Metro	A	Visit
37	WC	Drakenstein	LM	B1	Joint Meeting
38	WC	George	LM	B1	Visit (DWS only)
39	WC	Knysna	LM	B2	Visit (DWS only)
40	WC	Mossel Bay	LM	B2	Visit
41	WC	Stellenbosch	LM	B1	Joint Meeting
42	WC	Langeberg	LM	B3	Joint Meeting
43	WC	Breede Valley	LM	B2	Joint Meeting

No	Prov.	Name	Municipality		Visit
			Type	Classification	
44	WC	Witzenberg	LM	B3	Joint Meeting
Water Board					
1	EC	Amatola Water	-	-	Visit
2	FS	Bloem Water	-	-	Visit
3	LP	Lepelle Northern Water	-	-	Visit
4	NW	Magalies Water	-	-	Visit
5	KZN	Mhlathuze Water	-	-	Visit
6	WC	Overberg	-	-	Canceled
7	GP	Rand Water	-	-	Canceled

Remark 1 : Abbreviation of Province
EC: Eastern Cape, FS: Free State, GP: Gauteng, KZN: KwaZulu-Natal, LP: Limpopo, MP: Mpumalanga, NW: North West

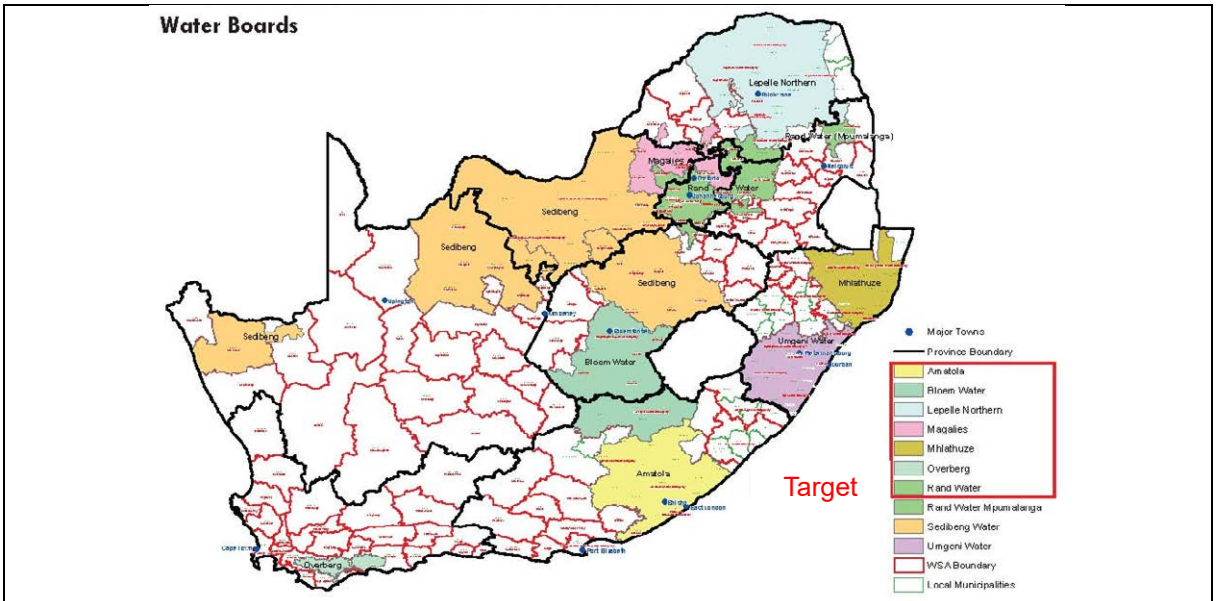
Remark 2: DWS's Classification of Municipalities as Water Services Authority

Metro	A	- Largest cities or metros - Metropolitan municipalities
LM	B1	- Secondary cities; those with next largest budgets - Local municipalities with a large town or city as its urban core
	B2	- Municipalities with a large town as core - Local municipality with a medium town or towns as its urban core
	B3	- Relatively small population, significant proportion of urban population, but with no large town as core - Local municipality with a small town or towns as its urban core
	B4	- Municipalities which are mainly rural with, at most, 1 or 2 small towns - Local municipality with no urban core
DM	C1	- DM: District municipalities that are not WSAs
	C2	- DM: District municipalities that are WSAs



Source: DWS and Project Team

Figure 3-1: Location Map of Municipalities (WSAs)



Source: DWS and Project Team

Figure 3-2: Location Map of Water Boards

(4) Questionnaire for the Baseline Survey

The Project prepared the project briefing paper and questionnaire through discussions with DWS and SALGA (refer to Appendix 2 for details). In the beginning, the Project examined a comprehensive questionnaire that covers overall water supply service including needs, human resources development, etc., as well as NRW. However, the Project sorted out the questionnaire concisely in terms of volume of questions and the existing information. A summary of the main points sorted out can be found below.

Main Items on Baseline Survey

- General Information
- Chapter 1: Human Resources Development on Water Supply Sector
  - 1.1 Current Status of Water Supply Service Section
    - Organization and technical skill level
  - 1.2 Human Resource on Water Supply Service Section
    - Basic information of training programme, participation of training course and its record, lecturer information, cooperation for IBTC and participation, information on training centre and training needs
- Chapter 2: NRW
  - 2.1 Water Balance Data and Its Analysis
    - Water source, the existing water supply facilities and equipment for NRW reduction
  - 2.2 Policy, strategy, plan and implementation on WCWDM and reduction of NRW
- Chapter 3 Financial Status on Water Supply Service Section

(5) Results of Baseline Survey

Table 3-3 shows the results of baseline survey. The Project expected collecting answers from at least 30 municipalities, but eventually analyzed answers from 26 among municipalities and Water Boards, because data collection from the remaining municipalities was not possible.

On the other hand, the Project planned to collect answers by using the shortened version of questionnaire form about 110 municipalities which are not visited by the Project. However, DWS expressed concerns on dealing with the survey results and on the possibility of confusion to municipalities. Therefore, the Project suspended distributing the shortened version of questionnaires.

Table 3-3: Results in Baseline Survey (as of March 2017)

Survey Target	Number of Planned Visit	Number of Visit	Number of Collection and its Ratio
Local Municipality	28	28	16 (57%)
District Municipality	8	8	4 (50%)
Metro Municipality	8	8	4 (50%)
Water Board	7	5	2 (29%)
Total	**51**	**49**	**26 (51%)**

Source: Project Team

(6) Other Information

In order to supplement the baseline survey, the Project utilized information shown in Table 3-4.

Table 3-4: Other Information for Reference

Documents	Source	Remark
Literary Document		
The State of Non-Revenue Water in South Africa	DWS	Current status of NRW
Municipal Services Strategic Assessment	DWS	Diagnosis for vulnerability of WSAs
No Drop 1st Order Assessment	Ditto	Analysis for NRW
Metropolitan Municipality Water Balance Assessment	Ditto	Water balance analysis in metro municipality
Municipal Benchmarking Initiative on Water Services	SALGA, WRC	Comparison of water supply service among municipalities
Relevant documents and information on Free Basic Water	DWS and etc.	Policy of free basic water and how it works
Private Skill Development Provider		
Interview with Water Academy	Western Cape Province	Training organization accredited for qualification (Water & Wastewater Reticulation System Services, etc.) for targeting local municipalities
International Water Association (IWA) Water Loss Conference (7th to 9th May 2017)		
Presentation by main stakeholders	DWS, municipalities and private consultant firm, etc.	Joint discussion among participants in charge of WCWDM and NRW of each organization

3.2 Activity 1-2: Compile and analyze skills development and NRW in municipalities.

(1) Findings from the Baseline Survey

Appendix 2 describes the findings from the baseline survey in detail. The findings were presented and confirmed in the 1st facilitator technical meeting in July 2019.

Table 3-5 shows training needs that municipalities answered and will be of reference to develop the training programme under the Project.

Table 3-5: Training Needs confirmed with Municipalities

Municipalities / Training Needs	Metro M.	Local M.			District M.	Total
	A1	B1	B2	B3	C2	
Plumbing	2	6	2	2	2	14
Water Reticulation	2	5	2	2	2	13
Process Control	2	4	2	1	3	12
Water Quality	1	5	1	2	3	12
Supervision		5	2	2	2	11
Design		2	1	1	2	6
O&M		2			2	4
Water Balance		1	1			2
Others		7		1	8	16

Source: Project Team

Comprehensively, plumbing and water reticulation are required for training as first and second rank respectively. Medium-scale local municipalities stated needs on strengthening capacity development of supervision, design, O&M and International Water Association (IWA) water balance.

In addition, it is likely that needs of training on NRW is high, because municipalities conducted the training on process control, plumbing and reticulation at the top three of training in the past three years. Qualification of these trainings are accredited as the National Qualification Framework (NQF) Level 2 to 6. Thus, it is deemed that most of municipalities are interested in practical training.

On the other hand, the lack of budget for training and the insufficient number of staff to be sent in training in small and medium scale municipalities especially at B1 to B3 and C2 through interview during the visit were ascertained. This situation must be considered for developing training programme and its implementation. Most of the training in which municipalities participate are limited to the training provided and/or granted by LGSETA and etc. This means, as long as municipalities receive training opportunities and grants from LGSETA and etc., the municipalities send learners in the training.

Regarding the conditions of NRW reduction in municipalities, about 88% of municipalities have conducted IWA water balance analysis according to the answer to the questionnaire (as stated later, reliability and accuracy of answer are sceptical). Water loss and commercial loss make up about 50% and about 23% respectively as the main causes of NRW. In addition, there are challenges such as inaccuracy of water meters as commercial loss and aging of water supply facilities.

(2) Observation and Project Direction

As the result of interview, questionnaire, analysis of the DWS's No-Drop assessment data, other information and discussions among project members, the Project concluded observation and project direction as below (refer to Appendix 3 for details).

1) Observation

It is observed that the calculation of revenue water based on actual water consumption is ambiguous and irregular and this consequently poses a major problem in NRW management and reduction in South Africa. This is due to the fact that water supply services and meter reading & bill collection data are not linked due to the separation of water supply section and finance section of municipalities, in addition to Free Basic Water (FBW) making it difficult to conceive an accurate cipher on water consumption. Also, a lack of staff for water supply services in the small-scale municipalities makes these municipalities face difficulties in taking preventive actions and limiting their actions to only leak repairs as an emergency response. It is also difficult for municipalities to make appropriate proposals for budget, based on evidences because of lack of skills and data. Behind this background, a lot of municipalities have challenges such as the outflow, retirement of skilled/experienced staff and the difficulty in securing well-qualified staff.

From a technical point of view, it is advisable that municipalities should realize proper measurement, calculation and monitoring of water consumption, make water balance analysis accurate, ensure transparent water services, and be capable of formulating strategies and implementation plan to reduce NRW.

2) Project Direction

As the key organizations which lead NRW and WCWDM in South Africa stated in the IWA Water Loss conference, there is not enough data for water balance or there are problems on data in terms of inaccuracy. The Project aims at developing capacity of staff who contribute to NRW reduction in municipalities, but from this aspect, it is efficient for short and medium term that the Project focuses on where water flow meters are installed, how water flow are measured/monitored and maintained, and how data are collected/analyzed.

The above contributes to collection of IWA water balance data and their analysis, which will result in capacity development of strategic planning in municipalities and nationwide. There are no adequate water consumption data in most of municipalities, so these municipalities cannot formulate strategic plan (prioritization of actions) on NRW reduction without appropriate data. Therefore, it is considered that staff cannot make budget plan and implement NRW reduction, even though staff participate in the training on NRW reduction.

Consequently, it is most useful for NRW reduction and eventually improvement in water services that a lot of municipalities become able to analyze water balance through monitoring of water consumption and flow rate, etc. and strengthen collaboration with DWS and SALGA. In addition, it is also important that municipalities, through group trainings, establish a cooperative framework on information sharing among them. Moreover, the key to the Project is to build a framework that can provide municipalities with opportunities to participate in training, including grants for participation and utilization of subsidies with the cooperation of stakeholders.

3.3 Activity 1-3: Review needs of skills development on NRW, existing qualifications, roles and responsibility of DWS/IBTC.

(1) Skill development in the water sector

1) Department of Water and Sanitation (DWS)

DWS is the national supervisory authority on water and sanitation, and the core implementing body for NWRS-2. DWS provides trainings to its staff (including training programmes in IBTC), and scholarship programmes aiming at securing the future human resources. Meanwhile, DWS has planned and financed "War on Leak" programme implemented in the past three years to foster 15,000 artisan plumbers.

In addition, DWS provides "Process Controller Registration Certificate", an original certificate to Water Boards and municipality staffs for water and wastewater treatment process management.

War on Leak Programme

It is a programme that leads to acquiring qualifications of the Artisan Plumber (Quality Council for Trades and Occupations: QCTO Trade mainly for in-house plumbing) for the young unemployed as "Water Agent" (the programme's unique name) of municipalities to deal with water leakage. DWS has outsourced the implementation to Rand Water, and further re-outsourced to private skill development providers preparing materials, and planning to deploy the programme nationwide with the workplace experiences provided by municipalities.

2) Water Boards (WBs)

Water Boards (WBs) provides in-service training, learnership programme for own staff and relevant municipalities' staff to foster water and wastewater treatment process managers and experienced technicians, scholarship programme, internship programme as well as sponsors various programmes.

The learnership programme, especially known as a leading programme toward official qualifications, is often held at Water Board's authorized training facilities such as treatment plants, testing laboratories, and lecture rooms by outsourced trainers. Rand Water owns "Rand Water Academy" an authorized training function with its exclusive learners, for the certificate of the treatment process management. Although Water on Leak programme involved Rand Water as an implementing agency, the training has been provided by the outsourced skills development providers.

3) Municipality (Water Services Authority: WSA)

Although municipalities usually provide in-service training, only metro and some small or medium scale municipalities can provide systematically the water-related human resources development, with examples shown below, due to limitation on budget, planning and implementation capacity, and facility and equipment. The following shows examples:

Tshwane Metro	There is a plumber training facility but only for in-house, not for reticulation. Therefore, on-the-job training or private provider's training is necessary to improve their skills. The training yard construction for new WRP (new qualification) certificate was taken back to the beginning.
eThekwini Metro	There are a plumber training facility, and a training yard for skill instruction and test on the trader registration and quality management.
Ugu District Municipality	There is its own pressure reducing valve (PRV), piping model and Leak detection yard. However, these facilities have not been used since the contract with a private consultant who proposed the design was over.

Municipalities take the trainings provided by public or private skill development providers, utilizing their own budget for human resource development or LGSETA training programme. However, small and medium-scale municipalities are not necessarily capable of fostering human resources by actively using these programmes due to staff shortage. Such municipalities remain on-the-job training by experienced staffs in daily operation and maintenance. Due to retirement of the experienced staffs, technology succession becomes difficult.

In addition, the technical guidance programme by Municipal Infrastructure Support Agent (MISA) under the Department of Cooperative Governance and Traditional Affairs (CoGTA), and another technical guidance programme utilizing Infrastructure Skills Development Grant (ISDG) of the National Treasury have been implemented for some municipalities. In general, the programmes provide guidance and support to municipalities that have insufficient capacity of public services, or that have difficulty to maintain the services due to financial collapse. Both programmes are entrusted to private skill development providers and consultants, and make use of retired engineers.

Metropolitan municipalities often outsource external skill development providers with providing certified training facilities such as a treatment facility, testing laboratory, lecture rooms and workshops, to internal group training programmes for their staffs.

(2) National Qualification Framework (NQF)

NQF is a national system established to evaluate the level of qualification or degree certified by multiple evaluation councils in a single framework. In particular, it is not only a comprehensive scheme that classifies, registers, publishes, and consolidates quality-assured national qualifications, but a collection of principles and guidance on which acquired achievement records are registered, in order to enable the national certification of skills and knowledge on training applicants (post compulsory education). It encourages "lifetime learning" thereby, contributing to socioeconomic development of the country. The objectives of NQF are as follows:

a. To develop a single national framework to consolidate acquired achievements
b. To promote access to training and career path opportunities, and thereby to secure mobility and continuity of student's achievement
c. To improve quality of trainings
d. To promote affirmative action in the past unfair employment and training opportunity

South African Qualifications Authority (SAQA) has promoted, developed and coordinated NQF. There are sub-frameworks in NQF which have jurisdiction over 3 areas, and a quality council is established in each sub-framework. Table 3-6 shows the relation between the sub-frameworks of NQF and the quality councils (SAQA and the roles of the quality councils is described later).

Table 3-6: Sub-Frameworks of NQF and the Quality Councils

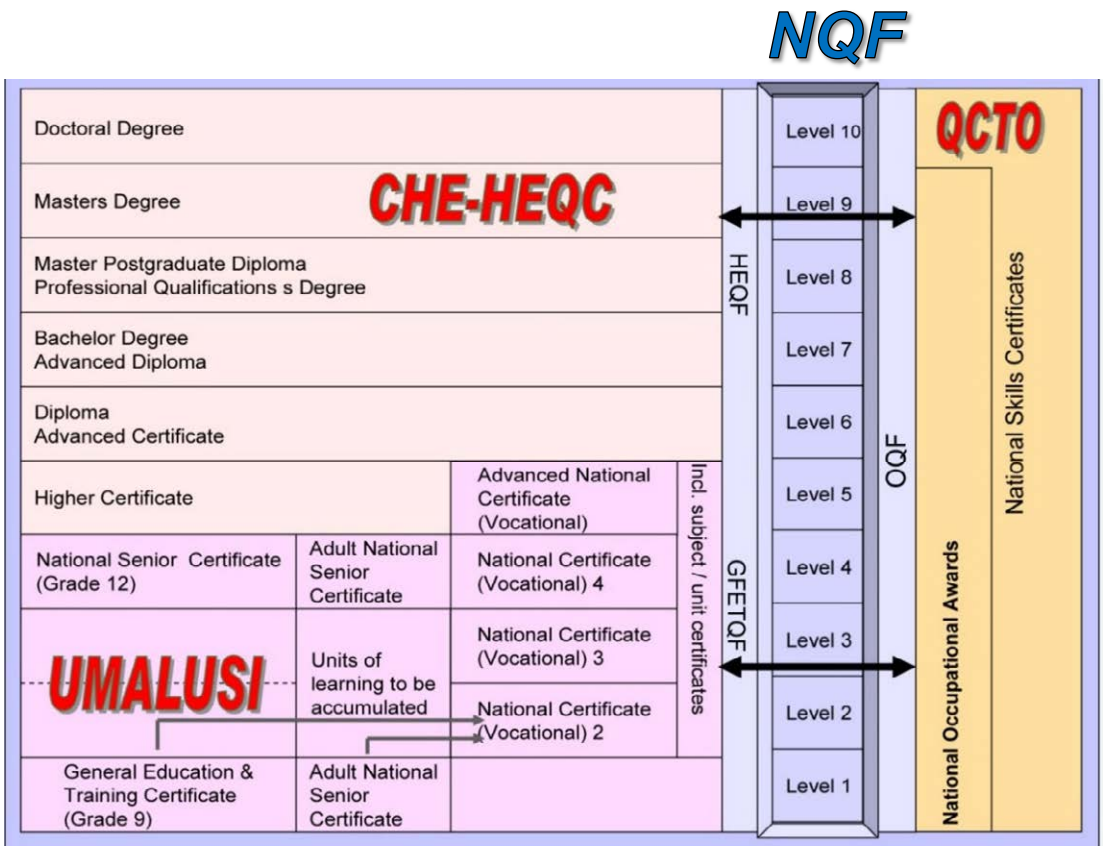
Sub-Framework	Quality Council	Implementing Organization
Higher Education Qualification Framework (HEQF)	Council of Higher Education (CHE), Higher Education Qualification Committee (HEQC)	Universalities, Institutes of Technologies
General and Further Education and Training Qualifications Framework (GFETQF)	General and Further Education and Training Quality Control (Umalusi)	Technical and Vocational Education and Training (TVET) colleges, Accredited public / private colleges
Occupational Qualifications Framework (OQF)	Quality Council for Trades and Occupations (QCTO)	Technical and Vocational Education and Training (TVET) colleges, public / private skills development providers

There are 10 NQF levels for acquired achievements in each category and skill, as an indicator to objectively and publicly prove the achievement results. Table 3-7 shows the Level Descriptor of the NQF level from the viewpoint of Quality Council for Trades and Occupations (QCTO).

Table 3-7: NQF Level Descriptor from the viewpoint of QCTO

NQF Level	**Typical Activity** (predominant things a person will do)	**Role** (characteristics of the expected functions)	**Workplace Focus** (things or people to interact or deal with)
10	Envisioning future scenarios	Visionary leadership	Future shape of organization, industry, profession
9	Set and implement strategies	Leading and directing	The 'business landscape' or profession
8	Manage or design systems	Resource management	Policy, resource allocation
7	Manage or design processes	Changed Practices	New technology, systems
6	Develop and implement changes	Optimization	Improvements
5	Maintain efficiencies	Stability and consistency	Systems
4	Setup processes and solve process problems	Process management	Process data
3	Adjust, maintain and oversee	Procedures	Productivity
2	Monitor, support	Operations	Machinery
1	Perform elementary tasks	Task	Machines, tools

Figure 3-3 shows the correlation between the NQF level and qualification/degree in the sub-frameworks. It describes that NQF evaluates the level of qualification and degree certified by the multiple evaluation councils in a single framework.



Source : Draft Policy for the Quality Council for Trades and Occupations, 2008

Figure 3-3: Correlation between NQF Level and Qualifications / Degrees

In general, promotion and positioning to certain engineering posts (e.g. Engineer, Technologist, and Technician) in municipalities requires the completion of each level in higher education (university).

On the other hand, promotion and positioning to field staff (Supervisor / Superintendent / Site-Manager, Artisan, Assistant Supervisor / Superintendent / Site-Manager and General Workers) are determined considering the completion of each level of vocational learning at Technical and Vocational Education and Training (TVET) etc. (National Certificate: N-Course), artisan qualifications, other vocational qualifications and years of experience.

Table 3-8 shows correlation between positions in municipalities as WSAs and qualification/degree in the NQF.

Table 3-8: Correlation between Positions in Municipalities (WSAs) and Qualification/Degree in the NQF

NQF Level	General Education	TVET (N-Course)	Trade Test	Higher Education	Positions in Municipalities (WSAs)
Councils*1	Umalusi(GFETQF)		QCTO(OQF)	CHE(HEQC)	-
10				Doctor	-
9				Master	Technical Diretor / Engineer
8				Bachelor Honours	
7				Bachelor	Technologist
6			Artisan	Diploma	Technician
5		Advance NC(V)		Higher Certificate	Supervisor/Super-intendent/Site-Manager
4	G12	NC(V)4			Assistant Supervisor/Super-intendent/Site-Manager, General Workers
3	G11	NC(V)3			
2	G10	NC(V)2			
1	G9				

*1 Refer to Table 3-6.

(3) Organizations related to qualifications

1) South African Qualifications Authority (SAQA)

SAQA is an organization, set up under the Department of Higher Education and Training (DHET), responsible for NQF. Mandates of the SAQA are summarized below.

a. To promote NQF.
b. To further develop NQF and monitor the NQF implementation.
c. To coordinate the sub-frameworks.

Regarding the qualification, SAQA's scope of services are as below:

a. To develop and implement policies and standards for development, registration and publication of qualifications (or part of qualifications) in consultation with the evaluation councils.
b. To register qualifications (or part of qualifications) proposed by the evaluation councils if the qualifications satisfy related criteria; and
c. To develop policies and standards for evaluation, Recognition of Prior Learning (RPL), and credit accumulation and transfer in consultation with the evaluation councils.

2) Quality Councils

As described in Table 3-6, NQF has 3 sub-frameworks with each separate evaluation council (CHE-HEQC, Umalusi and QCTO). The function of the evaluation councils in NQF is as follows:

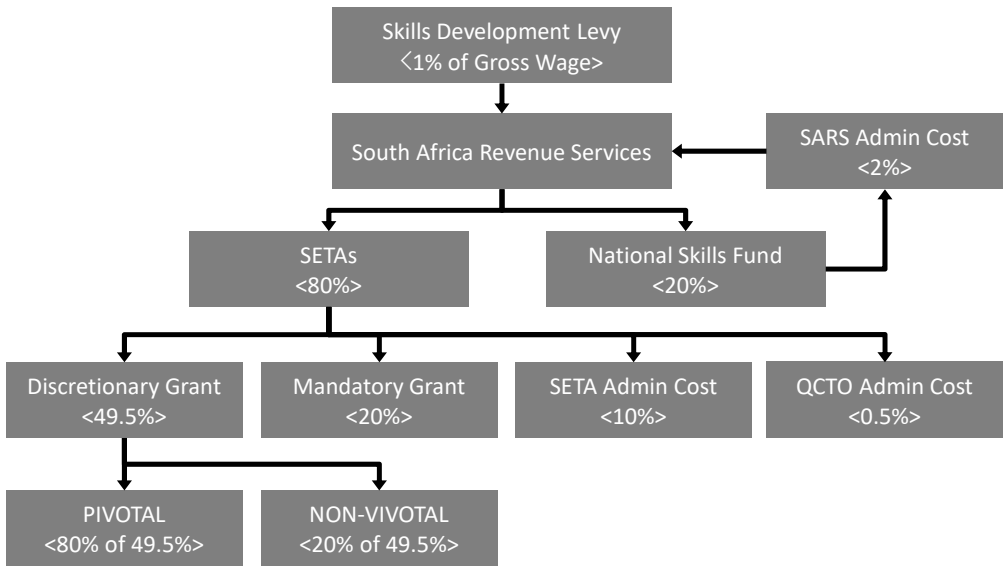
a. To develop and advise the sub-frameworks and provide advise
b. To develop qualifications (or part of qualifications) necessary for related sectors, including proper training achievement evaluation methods
c. To advise SAQA on registration of qualifications (or part of qualifications)
d. To assure quality of the sub-frameworks
e. To issue qualification certificates to those who completed training programmes

3) Sector Education and Training Authority (SETA)

SETA, established under the Department of Higher Education and Training (DHET) that has jurisdiction over skill development, is one of the core implementation authorities in National Skills Development Strategy (NSDS), together with DHET. SETA consists of 21 sectors, and EWSETA and LGSETA are SETAs for the water sector. The function of SETA is as follows.

a. To develop Sector Skills Plan (SSP) in line with NSDS framework
b. To implement SSP
   - Learnership development (one kind of skill development forms which consists of theoretical training and on-the-job training, to be implemented with agreement upon SETA, employer, and skill development agency, leading to qualification acquisition)
   - Approval of a vocational skill plan
   - Disbursement and distribution of subsidies
   - NQF development support
   - Quality assurance (certification of skill development agencies, skill development monitoring, assessor registration, cooperation with other quality assurance authorities, and reporting to SAQA)
c. Learnership promotion (Designation of workplaces for field experiences, support on training material development, improvement for smooth skill development, and support on the agreement preparation and its registration)
d. Cooperation with NSA (policies, strategies, and SSP)
e. Information improvement (employment opportunities, skill development providers <-> labor market)

In addition, the structure of the SETA grants and the allocation ratio are shown in Figure 3-4. Discretionary grants, especially each SETA's allocation of grants for skills prioritized in each SETA's PIVOTAL programme are of significance. Effective use of the grant is the key to provide trainings at the educational training organization which employers certifies for training applicants. Currently, the existing model is under review, and change in SETA's name, roles, and grant allocation rates etc. is being considered.



Reference: Prepared based on Guidelines on the Implementation of SETA Grant Regulations (2015), DHET

Figure 3-4: SETA's Grant Breakdown (Standard)

Table 3-9 and Table 3-10 show the PIVOTAL priority lists in LGSETA and EWSETA respectively. Both are focused on excess and deficiency of staffs with required skills, but it seems different from the needs on detailed skill development of human resources in municipalities.

The PIVOTAL priority list in LGSETA is subject to general public services, not specialized in the water sector.

The list in EWSETA, on the other hand, includes energy sector. For the water sector, the PIVOTAL list has been prepared with understanding of the human resource development needs based on information from DWS, Water Boards and private companies, and skill development plans prepared by those organizations.

Table 3-9: LGSETA's PIVTOTAL Priority List

Occupation code	Occupation	Specialization/Alternative Title	Intervention Planned by the SETA'	NQF Level	Quantity Needed
121101	Financial manager	Accounting System Manager, Budget Manager, Chief Accountant, Budget Management Chief, Financial Manager, Financial Chief, Accounting Auditor, Foreign Currency Manager, Country Revenue Manager, Revenue Assessment Manager	- Local finance, management training plan / national certificate, certificate of accounting to local government - Learnership	6&7	31
121104	Internal audit manager	Internal audit manager	- Local finance, management training plan / national certificate, certificate of accounting to local government - Learnership	6&7	34
121905	Project Manager	Project Director	- Learnership - Intervention on candidates	6&7	111
132301	Construction Project Manager	Construction Work Manager, Execution Manager, Construction Field Manager, Construction Project Leader, Land Development Manager, Infra Development Technical Manager	- Approval of plans and development - Labor-intensive construction - Infrastructure asset maintenance	6	56
214201	Civil Engineer	Bio system Engineer, Execution Engineer, Environmental Engineer, GIS and Land Management Engineer, Geological Engineer, Hydraulic Engineer, Field Designer	- Certificates - Skill development plans - Learnership - Internship to plan development	6&7	150
216401	Urban and Regional Development Planner	Community/County/Regional Planner, Environmental Planner, Land Use Planner, National Resources Management Consultant, Officer/ Planner, Urban Planner, Transportation Planner	- Degree and Completion Certificate - Learnership	6&7	58
241101	Accountant	Bank Accountant, Deft Manager	- National certificate, municipality accounting certificate/Senior accounting - Learnership	6&7	149
313201	Water Treatment Facility Operator	Wastewater Treatment Facility Operator, Wastewater Management Engineer, Water Treatment Plant Operator, Water Distribution Facility Operator	- Learnership, RPL, skill development plans	4	212
331301	Financial Administrator	Chief Financial Manager	- National certificate, municipality accounting certificate - Learnership	4&5	158
642601	Plumber (Regular)	Hydrant Technician, Firefighting Plumber, Plumbing Maintenance Technician, Plumbing Work subcontractor, Sanitary Piping Technician, Sprinkler Technician, Water Plumber	- Apprenticeship, Learnership	4&5	117
671101	Electrician (Regular)	Mechanical Technician, Armature Winder, Coil Winder, Electric Work Subcontractor, Electrical Technician, Electrician, High Duty Coil Winder, Motor Coil Winder, Rail Signal Electrician	- Apprenticeship, Learnership	4&5	221

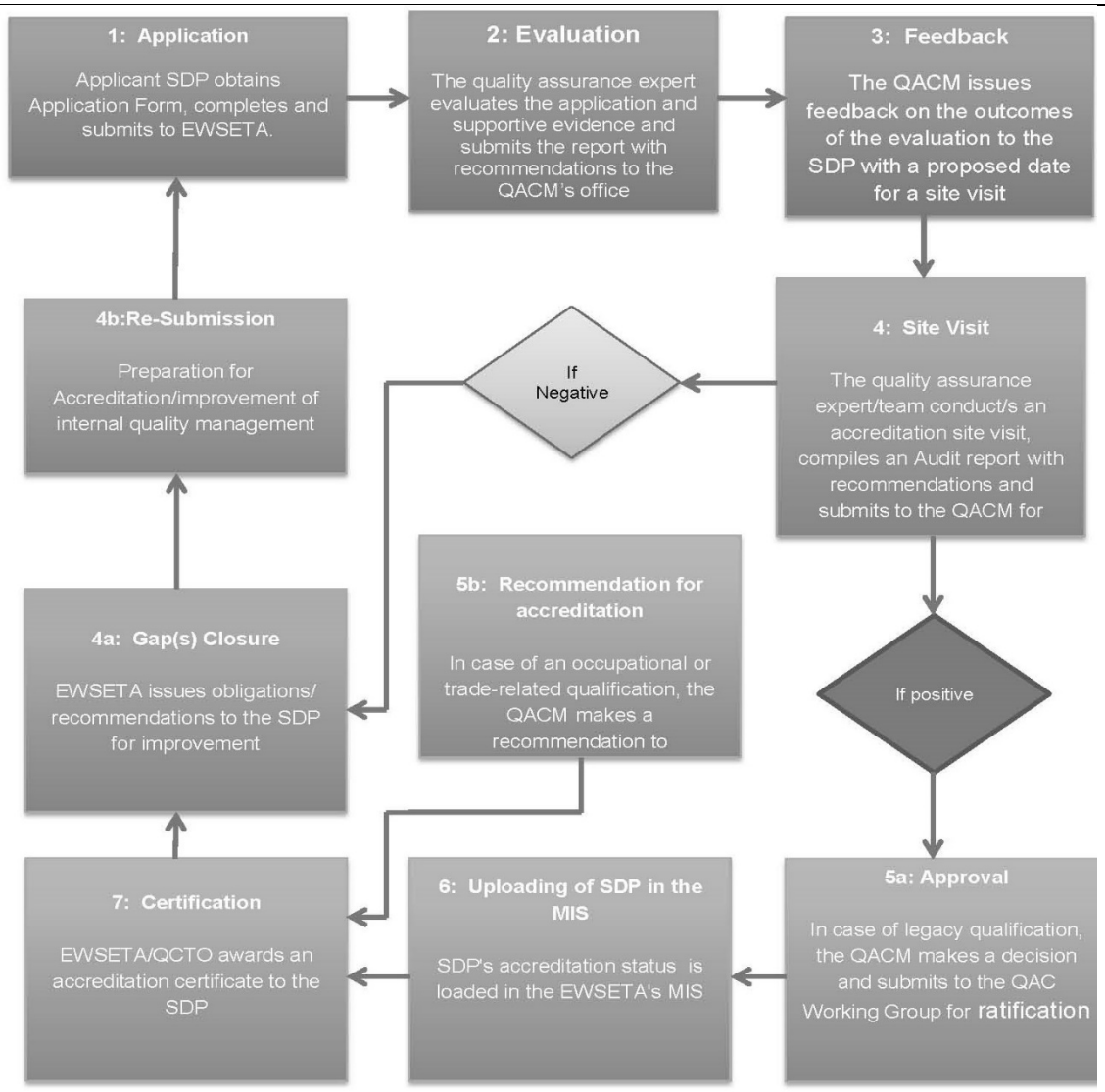
Reference: LGSETA Sector Skills Plan 2016-2017 (2016)

Table 3-10: EWSETA's PIVTOTAL Priority List

Occupation Code	Occupation	Specialization/Alternative Title	Intervention Planned by the SETA	NQF Level	Quantity Needed
121905	Programme Officer, Project Manager	Project Director	- Allocation of trainees for on-the-job training - Learnership and scholarship	5,6	1,000
214301	Environmental Engineer	Air Pollution Control Engineer, Water Resources Specialist	- Scholarship for research on engineering and water science	6,7	2,500
213306	Water Analysis Technician	Waterway Engineering Officer, Hydraulic Engineering Officer, Wastewater Treatment Officer/ Technician	- Scholarship for research on engineering and water science	6,7	2,500
215103	Energy Engineer	Bioenergy Engineer, Energy Service Engineer, Hydro-energy Engineer, Nuclear Energy Engineer, Renewable Energy Engineer, Solar Energy Engineer, Wind Energy Engineer	- Scholarship for research on engineering	6,7	5,000
214201	Civil Engineer	Bio system Engineer, Architectural Engineer, Geotechnical Engineer, Forestry Engineer	- Scholarship for research on engineering	6,7	1,000
215101	Electrical Engineer	Control Engineer Power Equipment Engineer, Electrical Design Engineer, Power Distribution Engineer, Power System Engineer	- Scholarship for research on engineering - Apprenticeship	5,6	1,000
671101	Electrician	Building Electrician, Wiring Work Technician, Electrical Installation Technician	- Learnership - Apprenticeship and scholarship	2,-5	3,000
313106	Concentrated Solar Power Process Management Technician	Concentrated Solar Power Technician, Thermal Solar Plant Operator	- Learnership - Apprenticeship and scholarship	2-4	3,000
313201	Water Treatment Operator	Wastewater Treatment Operator, Sewage Management Engineer, Water Treatment Technician	- Learnership	2-4	1,000
642602	Solar Power Installation Engineer	Solar Power Installation Engineer, Thermal Solar Power Installation Engineer	- Learnership - Apprenticeship and scholarship	2-4	3,000

Reference: Extent of support for skills generation in the water sector, EWSETA, 8th Nov. 2016

"The accreditation of Skills Development Provider (SDP)," is one of SETA's roles, and its procedure is shown in Figure 3-5.



Reference: Accreditation Procedure for Skill Development Provider, EWSETA

Figure 3-5: Schematic Representation of Accreditation Process

EWSETA has registered the certificates on SAQA as shown in Table 3-11 for the water sector, and accredited and audited skill development providers, and is going to substitute them to new certificates which is currently under development (refer to Table 3-12), as described in the following "(4) The National NRW Training and related existing qualifications."

Table 3-11: EWSETA's SAQA-registered Qualifications for Water Sector

SAQA ID	Certificate type	Certificate name
60169	National Certificate	Water and Wastewater Reticulation Services NQF Level 2
60155	National Certificate	Water and Wastewater Reticulation Services NQF Level 3
60189	Further Education and Training Certificate	Wastewater and Water Reticulation Services NQF Level 4
58951	National Certificate	Water and Wastewater Treatment Process Operations NQF Level 2
60190	National Certificate	Water and Wastewater Treatment Process Operations NQF Level 3
61709	Further Education and Training Certificate	Water and Wastewater Treatment Process Control Supervision NQF Level 4

(4) The National NRW Training and related existing qualifications

EWSETA currently manages the qualification system (Water & Wastewater Reticulation System Services, NQF Level 2 to 4).

At the beginning of the Project (August 2017), the Project had a plan to select NRW-related items from the credits (Unit Standard: US) required to obtain the above qualification and combine them to design the National NRW Training accredited in the South African qualification system.

In the baseline survey, the Project observed that the qualification is not effective in the field (workplace) and is recognized as an outdated qualification, and also the qualification registration at the SAQA will expire. Based on the agreement of the 2nd JCC meeting, the Project decided to design practical training that would directly lead to problem solution of NRW in municipalities without accreditation of the National NRW Training.

(5) The National NRW Training and related new qualification development

In order to achieve NWRS-2, the Framework Programme for Research, Education & Training in the Water Sector (FETWater) established for Water Sector Skills Development Initiatives under DWS is currently preparing 9 new qualifications for 5 categories: Water Resource Planning and Implementation, Water Allocation, Authorization and Licensing, Water Monitoring and Assessment, Institutional Management and Water Governance, Water Infrastructure (refer to Table 3-12). These qualifications are substitute for the EWSETA's US qualification model described above, in accordance with QCTO qualification model (Knowledge, Practice and Workplace).

Within the new qualifications, "Water Reticulation Practitioner: WRP (NQF Level 8 equivalent), related to the National NRW Training, covers all water distribution practices (from effluent point of reservoir to customer's water meter).

Table 3-12: Prioritized Qualifications in FETWater Programme

Net-work	Water Resource Planning and Implementation	Water Allocation, Authorization And Licensing	Water Monitoring And Assessment	Institutional Management and Water Governance	Water Infrastructure	
Higher Level	Water Resource Management Practitioner (NQF 8)	Water Use Authorization Practitioner (NQF 8)	Water Regulation Practitioner (NQF 8)	Water Liaison Specialist (NQF 8)	Water Infrastructure Specialist (NQF 8)	
Middle and Lower Level	Water Use Officer (NQF 5)			Water Conservation and Sanitation Officer (NQF 6)	Water Reticulation Officer (NQF 4)	Water Process Controller (NQF 3)

The WRP qualification has been already registered as a SAQA qualification. Training and qualification will be implemented between 2020 and 2024, however it has not been implemented yet as of March 2021.

Members of the development group: LGSETA will be a quality assurer of the WRP qualification, City

of Johannesburg as an assessment centre, and City of Tshwane as a model skill development provider (including a training yard). However, City of Tshwane has suspended constructing the training yard. but currently the plan has been suspended. A private company(ies) has developed model learning materials.

Table 3-13 shows the WRP qualification programme:

Table 3-13: Programme of Water Reticulation Practitioner Qualification

No.	Title	NQF Level	Credit	Training Days
SECTION 3A: Knowledge				
KM-01	Workplace fundamentals	3	5	6
KM-02	The world of the water reticulation practitioner	4	6	8
KM-03	Tools, equipment and electronic devices	3	5	6
KM-04	Basic slinging and lifting operations	2	7	9
KM-05	Water reticulation systems	4	17	21
KM-06	Pipes, piping and pipe joining	3	3	4
KM-07	Pipe laying, valves, actuators, pumps and water meters	4	9	11
KM-08	Operating and maintaining a water reticulation system	4	12	15
Sub-Total		**-**	**67**	**84**
			4.2 months	
SECTION 3B: Practice				
PM-01	Use tools and equipment	3	5	6
PM-02	Perform welding, gas-cutting and lifting activities	3	10	12
PM-03	Conduct lifting operations	2	6	8
PM-04	Install, test and commission water reticulation infrastructure	4	20	25
PM-05	Work safely and respond to emergencies	3	5	6
PM-06	Operate and maintain a water reticulation system	4	18	23
PM-07	Manage a water reticulation team	4	3	4
Sub-Total		**-**	**64**	**80**
			4.0 months	
SECTION 3C: Work experience (workplace)				
WE-01	Installation processes for water reticulation infrastructure	3	58	-
WE-02	Processes to operate & maintain a water reticulation system	4	50	-
WE-03	Processes to manage team members	4	6	-
Sub-Total		**-**	**114**	**142.5**
			6.7 months	
Grand-Total		**-**	**245**	**306.5**
			15 months	

(6) Roles and responsibilities of DWS/IBTC

As of the Project commencement (August 2017), trainings and qualifications carried out at DWS/IBTC are mainly for improving the skills of DWS's young staffs engaged in construction of water resource infrastructure (dams, waterways, reservoirs and incidental facilities). The trainings include occupational health and safety (certificate), initial-intermediate PC skill (certificate), and those preparing for certificate such as concrete material indoor test, diesel maintenance work etc. In the past, there is a track record of technical trainings such as welding work, electric work, spray paint worker, maintenance worker in regional offices, in cooperation with TVET. DWS/IBTC lacks in the human resources having skills and experiences in water supply services and skill development (training) related to NRW at the municipality level. Consequently, it is difficult for DWS/IBTC to conduct training single-handed for

municipalities nationwide, especially the National NRW Training (more particularly accredited training).

Given the abovementioned situation at that point, the experienced personnel of the external organizations such as municipalities who are responsible for daily water supply services should be set as facilitators in order to implement the NRW training, while DWS/IBTC should concentrate on inter-organizational coordination, including provision of the training venues and equipment, maintenance, and training subsidy application. It is also important to implement the trainings sustainably while monitoring and improvement, and to formulate a platform for information sharing and cooperation between municipalities.

3.4 Activity 1-4: Benchmark water supply services and its skills development in Japan.

The Project provided benchmarking opportunities through training-in-Japan programme twice for South African counterparts in April 2018 and July-August 2019, and also Joint Seminars for Water Supply Sector hosted by SALGA, the Japan Water Works Association (JWWA) and JICA with support of DWS in January to March 2021.

(1) The 1st Training in Japan

1) Summary of the 1st Training in Japan

Training Title: Project for Strengthening the Training Capacity of IBTC on Non-Revenue Water (Management)

Training Period: April 16, 2018 (Mon) to April 27, 2018 (Fri)

Trainees: 9 persons (DWS:3, SALGA:1, LGSETA:1, Municipalities:3, Tshwane University of Technology:1).

2) Objective of the 1st Training in Japan

To benchmark the Japanese cases in framework of water services administration, human resources development, training provision and water supply services by authorities, particularly NRW reduction. In this training the following three objectives were set in advance.

a. To understand framework of water supply administration in Japan comprehensively.
b. To understand human resources development skills development, training facilities and its operation, issues and challenges such as inter-municipality (or WSA) cooperation, mobilization of private recourses, staff aging, skill transfer, knowledge management and training quality assurance in water supply sector in Japan.
c. To understand efforts against NRW reduction in water supply sector in Japan.

3) Schedule of the 1st Training in Japan

The 1st training in Japan was conducted as following schedule.

Table 3-14: Schedule of 1st Training in Japan

Date	Time	Programme/Activity	Venue
4/16 (Mon)	9:30-11:00	JICA Briefing	JICA Yokohama
	11:00-11:30	Programme Orientation	
	13:30-13:45	Courtesy call on a senior official of JICA	JICA Headquarters
	14:00-15:35	Outline of water supply service in Japan	
	16:00-16:30	Courtesy call on a senior official of South African Embassy	South African Embassy in Japan
4/17 (Tue)	9:30-10:00	Role of Japan Water Works Association (JWWA)	JWWA
	10:00-11:00	Statically research for water service in Japan	
	11:00-12:20	Training programmes in JWWA	
	13:15-14:00	Introduction of Yokohama Waterworks	
	14:00-15:30	Qualification of service pipe plumbing and the nurturing of qualified plumbers.	
4/18 (Wed)	10:00-11:00	HRD system in Bureau of Waterworks, Tokyo	Training & Technical Development Center, Bureau of Waterworks, Tokyo
	11:00-12:00	NRW and efforts in Tokyo	
	13:00-14:15	Operation of practical training facility in Tokyo	
	14:15-15:30	Tour of practical training facility	
4/19 (Thu)	10:00-12:15	Site tour to Miyagase Dam, Kanagawa Water Supply Authority	Miyagase Dam
	13:00-14:00	Role of intake, Setting basin	Aoyama water resource office
	15:00-15:30	Small hydroelectric generation system	Kawai purification plant
	15:30-16:30	Membrane Filtration in Kawai Plant	
4/20 (Fri)	9:30-10:45	Water supply control system, SCADA	Nishiya purification plant
	11:00-12:00	Water museum	
	13:15-14:30	Mapping system	
	14:40-16:50	Water supply service business and HRD	
4/23 (Mon)	10:00-12:00	HRD in Yokohama	Nakamura Water Plaza
	13:30-14:30	Water Leakage Survey	
	14:30-15:30	Pass down skills and techniques	
4/24 (Tue)	9:00-10:30	Pipe replacement plan	JICA Yokohama
	10:45-12:00	Meter reading	
	13:45-14:15	Distribution block	In Yokohama city
	15:15-15:45	Courtesy call to Director General in Yokohama Water Works Bureau	Headquarters of Yokohama Waterworks Bureau (YWWB
4/25 (Wed)	10:00-11:00	Comprehensive training center	JWWA
	11:00-12:30	Visit to comprehensive training center	
	13:50-14:30	Material certification system	JWWA (Certification Centre)
	14:30-15:30	Water Supply equipment certification system	
	15:30-16:30	Visit to certification center	
4/26 (Thu)	9:30-12:00	Wrap-up discussion	JICA Yokohama
	13:00-16:00	Preparation of benchmarking meeting	
4/27 (Fri)	9:30-10:30	Meeting for benchmarking	
	10:30-11:15	Evaluation meeting	
	11:30-12:00	Closing ceremony	

4) Programme of the 1st Training in Japan

Programme of the 1st training was planned to achieve the above objectives of training targeted to management personnel with lecture, site visit, and discussions. The training was accepted by the Ministry of Health, Labor and Welfare (MHLW), JWWA, the Bureau of Waterworks of Tokyo

Metropolitan Government, the Yokohama Waterworks Bureau (YWWB), Service Connection Skills Promotion Foundation, Japan Sewage Works Agency. Trainees learned the role of ministries and agencies, statistics of water supply, trainings in Japan, material certification, human resources development (HRD) in Japan's water utilities, plumber qualification, and comprehensive training. The following table shows programme of the training.

Table 3-15: Programme of the 1st Training in Japan

Date	Title	Contents	Organization
4/16 (Mon)	Outline of water supply in Japan	Lecture and discussion as a National government about current water supply, issues of water works, technical improvement, skills transfer, and HRD	MHLW
4/17 (Tue)	Role of Japan Water Works Association	Learn a guidance/business model of Japan Water Works Association, about the role, position, and activity as a national organization.	JWWA
	Statically research for water services in Japan	Learn a statically research compiled and published by association, in accordance with guidelines for monitoring of water supply service in Japan.	
	Training programme in JWWA	Learn about training, and the research and development for water utility workers of technically and clerically.	
	Introduction of YWWB	Introduction of business of Yokohama Waterworks Bureau (YWWB)	Yokohama Water
	Qualification of service pipe plumbing and the nurturing of qualified plumbers.	Introduction of national service connection plumber qualification and the test, and the training system of the plumbers.	Service Connection Skills Promotion Foundation
4/18 (Wed)	HRD in Bureau of Waterworks in Tokyo	Learn planning of training, implementation, evaluation and review for training about HRD, transfer skills and knowledge in Bureau of Waterworks Tokyo Metropolitan Government	Bureau of Waterworks, Tokyo Metropolitan Government
	NRW and efforts by Bureau of Waterworks in Tokyo	Lecture of NRW reduction efforts/practices by Bureau of Waterworks and discuss feasible NRW reduction practices in South Africa	
	Operation of practical training facility in Tokyo	Visit training facility for knowing operation procedures, planning, evaluation in Tokyo	
4/19 (Thu)	Role of Water Supply Authority and Miyagase Dam	Site visit and learn establishment and role of Water Supply Authority, Roles of Miyagase Dam to know water resource planning.	Yokohama Water
	Role of Intake, Settling Basin	Site visit and learn sand basins, settling basins and intake of a doshigawa river in Yokohama.	YWWB
	Membrane Filtration in Kawai Plant	Site visit and learn Ceramic Membrane Filter purification, history of PPP, lower power consumption membrane purification.	Meta Water
4/20 (Fri)	Water supply control system	Water supply control in accordance with demand estimation at plant and reservoir.	YWWB
	History of water utility, Public relations.	Visit museum to know history from start of the first water supply system in Yokohama and purpose of museum, public awareness, elementary school visits.	Yokohama Water
	Mapping System	Learn current mapping system for complicated	YWWB

Date	Title	Contents	Organization
		pipelines, fittings, house connection mappings, property management, pipe network management, and water suspension area by closing valves.	
	Water supply service business and HRD	Learn about a good water supply management, the organization, skills transfer, HRD in Japan. Discuss the best practical method in South Africa.	JWWA
4/23 (Mon)	Skills transfer and techniques and HRD	Introduce HRD, skills transfer, in Yokohama Water Works. Learn the training in training yard, and purpose.	YWWB
	Planned Leak Detection	Learn active leak detection in Yokohama, such as planning, area setting, implementation, evaluations.	
	Practical training at training yard	Learn how to use leak detection equipment such as listening stick, ground microphone and correlator.	
4/24 (Tue)	Pipe replacement plan	Learn pipe replacement plan and the prioritization in Yokohama city for 9,300km pipelines.	
	Water meter reading	History of water meter, meter readings, method, equipment, billing system, action for non-payment, and water suspension.	
4/25 (Wed)	Comprehensive training center	Learn training of Japan Sewage Works Agency at practical training yard for swage system.	Japan Sewage Works Agency
	Material certification system in water sector	Visit certification center for water facility, equipment, chemicals which specified by an ordinance and the qualification.	JWWA's Certification Center

5) Use of the output of the 1st Training in Japan

Trainees made a presentation report on benchmarking of water services framework and training on non-revenue water in Japan (Appendix 4) and submitted the report to management of DWS at the project meeting. A lot of content was reported as a benchmark for South Africa compared to Japanese water supply, supply services, HRD, technical improvement, training system, training yard, skill development providers, skills transfer and knowledge management and quality control.

The following summary of the benchmarking results was reflected into the project management and the National NRW Training, and will be considered for development and improvement of water supply services in South Africa in the medium and long term.

- Long term commitment for HRD, and technical development
- Budgeting for NRW reduction measures
- A comprehensive training programme for water specialists (practitioners).
- An organization similar to the Japan Water Works Association (JWWA)
- Collaboration with municipalities to implement trainings.

(2) The 2nd Training in Japan

1) Outline of the 2nd Training in Japan

Training Title: Project for Strengthening the Training Capacity of IBTC on Non-Revenue Water (Facilitator/Admin.)

Training Period: 29th July to 9th August 2019 (10 weekdays)

Trainees: 17 (DWS: 7, SALGA: 1, LGSETA: 1, Municipalities: 8).
Remarks: 7 officials from DWS attended from 5th to 9th August 2019

2) Objective of the 2nd Training in Japan

Objective of the training is, at the working level, to benchmark the Japanese cases in water services administration, human resources development, training provision and water services delivery by authorities, particularly NRW reduction.

a. To understand practices in human resources development, skill transfer and knowledge management of Japanese water utilities.
b. To understand attitudes and efforts in water service delivery and NRW reduction of Japanese water utilities.
c. To benchmark human resources development and training provision of Japanese water utilities.
d. To review and improve the National NRW Training programme developed in the Project.

3) Schedule of the 2nd Training in Japan

The 2nd training in Japan was conducted as following schedule.

Table 3-16: Schedule of 2nd Training in Japan

Date	Time	Programme	Venue
29th July (Mon)	9:30-11:00	JICA Briefing	JICA Yokohama
	11:00-11:30	Programme Orientation	
	13:00-14:30	Outline of Water Supply in Japan	
	14:45-16:15	Introduction of Yokohama Waterworks Bureau (YWWB)	
30th July (Tue)	10:00-11:30	Dam managed by Kanagawa Water Supply Authority (KWSA)	Miyagase Dam
	13:00-14:00	Settling Basin and Intake, YWWB	Aoyama Office
	15:00-16:50	Water Purification Plant (Low Energy Type Membrane Filtration), YWWB	Kawai Water Purification Plant
31st July (Wed)	9:30-11:00	Effective Water Supply System	JICA Yokohama
	11:30-12:00	Distribution Reservoir	Nogeyama Reservoir
	13:30-16:00	Pumping Station	Nishiya Pumping Station
1st August (Thu)	10:00-12:00	Outline of Japan Water Works Association (JWWA)	JICA Yokohama
	13:30-15:00	HR Development Programme for Water Utilities by JWWA	
	15:00-16:00	Q & A, Exchange Session	
2nd August (Fri)	10:00-10:30	Courtesy Call on JICA	JICA Headquarters
	11:00-12:00	Water Services Management (1)	JICA Tokyo Int'l Center
	13:15-14:30	Water Services Management (2)	
	15:00-16:00	Courtesy Visit to the South African Embassy	South African Embassy
5th August (Mon)	9:00-11:30	Countermeasures against Non-Revenue Water (NRW)	JICA Yokohama
	13:15-14:15	Construction Site of Pipe Installation	Yokohama City
	15:30-16:30	Construction Management and Supervision	JICA Yokohama
6th August (Tue)	9:30-12:00	HRD Plan of YWWB	Nakamura Water Plaza
	13:15-14:15	Training Yard of YWWB	
	14:30-16:00	Q & A, Exchange Session	
7th August (Wed)	10:00-12:00	HRD System of Bureau of Waterworks, Tokyo Metropolitan Government	Training Center, Bureau of Waterworks, Tokyo Metropolitan Government
	13:00-14:00	Tour of the Practical Training Facility	
	14:10-16:00	Q & A, Exchange Session	
8th August (Thu)	9:00-12:00	Wrap-up Discussion/Review of the National NRW Training	JICA Yokohama
	13:00-17:30	Preparation of Benchmarking Results	
9th August (Fri)	9:00-10:30	Presentation	JICA Yokohama
	10:30-11:15	Evaluation	
	11:30-12:00	Certification	
	17:00-18:00	Courtesy Call on South African Ambassador	Ambassador's residence

4) Programme of the 2nd Training in Japan

Programme of the 2nd Training in Japan was planned to achieve the above objectives of training targeted to facilitators and administrative officials with mainly lectures, site visit and discussions. The training was implemented in MHLW, JWWA, the Bureau of Waterworks of Tokyo Metropolitan Government and YWWB. The following table shows programme of the training.

Table 3-17: Programme of the 2nd Training in Japan

Date	Title	Contents	Organization
29th July (Mon)	Outline of water supply in Japan	To understand differences in social/institutional background or context of water sector between South Africa and Japan (national government policy, water supply situation, issues, skill improvement and transfer, and HRD)	MHLW
	Introduction of YWWB	To know municipal water services in Japan (as a case of Yokohama City prior to site observation).	YWWB
30th July (Tue)	Dam	To observe municipal water services of Yokohama City from the upstream to the downstream (dam, bulk water, establishment and role of KWSA)	Yokohama Water
	Settling Basin and Intake	To observe municipal water services of Yokohama City from the upstream to the downstream (raw water intake, sand basin and setting basin)	YWWB
	Water Purification Plant (Low Energy Type Membrane Filtration)	To observe municipal water services of Yokohama City from the upstream to the downstream (membrane filtration purification, lower energy consumption, PPP)	Metawater
31st July (Wed)	Effective Water Supply System	To know municipal water services of Yokohama City from the upstream to the downstream (pressure management, energy-saving reticulation system, zoning, etc.)	Yokohama Water
	Distribution Reservoir	To observe municipal water services of Yokohama City from the upstream to the downstream (block system, reservoirs and O&M)	
	Pumping Station	To observe municipal water services of Yokohama City from the upstream to the downstream (booster pump station, reticulation facilities)	YWWB
1st August (Thu)	Outline of JWWA	To understand the voluntarily-formed water utilities association, inter-municipal collaboration in facilities, human resources, knowledge and experiences (JWWA's background, operation, roles and responsibilities and framework)	JWWA
	HRD Programme for Water Utilities by JWWA	To understand HRD in water services of Japan and its practices as a benchmarking of the National NRW Training by IBTC. (annual programme, implementing structure, needs analysis, planning, qualification/certification, tuition or attendance fee, training implementation/provision, lecturers, materials, background works, etc.)	
	Q&A, Exchange Session	To obtain essence, know-how and tips in HRD including training for water utilities as well as exchange knowledge and experiences between South Africa and Japan	
2nd August (Fri)	Water Services Management	To understand how water utilities have maintained services at a certain level in Japan (efforts, history, experiences and background factors) as well as their challenges	Yokohama Water
5th August (Mon)	Countermeasures against Non-Revenue Water (NRW)	To understand NRW in Japan such as strategic countermeasures, flow measurement, leakage control, pipe replacement, institutional framework for meter replacement regulated by Measurement Act, education and moral against illegal connections, and meter reading and accuracy.	Yokohama Water
	Construction Site of	To observe reticulation maintenance (municipal	YWWB

Date	Title	Contents	Organization
	Pipe Installation	piping works) in Japan	
	Construction Management and Supervision	To understand construction management and supervision (quality control, safety control, drawings, customer book, etc.) in Japan	Yokohama Water
6th August (Tue)	HRD Plan of YWWB	To understand HRD (including in-service training), skill transfer, self-development, knowledge management (training operation, facility maintenance, lecturers, materials, work items and volume including background works)	YWWB
	Training Yard of YWWB	To observe actual training facilities and O&M (facility & equipment maintenance, stock management, etc.)	
	Q&A, Exchange Session	To obtain essence, know-how and tips in HRD including training as well as exchange knowledge and experiences between South Africa and Japan	
7th August (Wed)	HRD System	To understand HRD (including in-service training), skill transfer, self-development, knowledge management (training operation, facility maintenance, lecturers, materials, work items and volume including background works)	Bureau of Waterworks, Tokyo Metropolitan Government
	Tour of the Practical Training Facility	To observe actual training facilities and O&M (facility & equipment maintenance, stock management, etc.)	
	Q&A, Exchange Session	To obtain essence, know-how and tips in HRD including training as well as exchange knowledge and experiences between South Africa and Japan	
8th August (Thu)	Wrap-up Discussion/Review of the National NRW Training,	To discuss/review the National NRW Training programme (concept, development model, framework, modules, etc.) for its upgrade/ improvement by comparison/benchmarking between South Africa and Japan.	JICA Experts
	Preparation of Benchmarking Results	To prepare benchmarking report(s) and presentation for the Project as a team.	
9th August (Fri)	Presentation, Evaluation and Certification	To present benchmarking report(s) and discuss it among participants. To evaluation of the training programme overall. To award certificates to trainees.	JICA

5) Use of the Output of the 2nd Training in Japan

Trainees prepared a presentation of benchmarking report as an output of the 2nd Training in Japan (refer to Appendix 4) and presented it in the 2nd Facilitator Technical Meeting in September 2019 as well as a debriefing to their organizations respectively. The report covers similarities between two countries as well as items being of reference to the South African water sector for improvement in a variety of category such as institutional arrangement, water supply administration, technical, innovation & technology, NRW, HRD, social, cultural, political and economic aspects.

The major suggestions as below are expected to be used to advantage to not only the National NRW Training under the Project but also human resources development, training programme and NRW management in South Africa.

- Fast-tracking of the policy of the review of municipal water services authorities to be stand-alone water business.
- Innovative and focused way to mitigate and deal with the various challenges and obstacles facing the water services sector.
- Design training for municipality to based critical analysis skills to identify and address critical priorities.
- Mandates, roles and responsibilities of all water sector stakeholder institutions should be realigned and integrated to improve efficiencies in water management.
- IBTC must be developed as the model in terms of piloting the Japanese system.
- The training facility should also be accessible to contractors/service providers.
- Funding for NRW management should be sourced from donors, water utilities or beneficiary institutions.
- Municipalities must be empowered and assisted to develop the 5 year WCWDM and NRW management strategies.
- To create and facilitate implementation framework of appropriate policy, regulations to address and secure compliance in a positive or negative environment.
- To create technical committees of experts to sustain institutional memory and a mentorship pool.

(3) SALGA-JWWA Joint Seminars for Water Supply Sector

1) Outline of the Joint Seminars

Seminar Title:	Project for Strengthening the Training Capacity of IBTC on Non-Revenue Water SALGA-JWWA Joint Seminars for Water Supply Sector
Seminar Dates:	1st Seminar: Human Resources Development : 28th-29th January 2021 2nd Seminar: Disaster/Emergency Response : 25th-26th February 2021 3rd Seminar: Product Quality and Tech. & Innovation : 18th-19th March 2021
Hosts	South African Local Government Association (SALGA) Japan Water Works Association (JWWA) Japan International Cooperation Agency (JICA)
Supported by	Department of Water and Sanitation (DWS)
Presenters:	19 officials from SALGA, JWWA, DWS, municipalities, a water board
Participants:	1,092 in total (Government, public institutions, municipalities, private companies, academia, media and third countries such as Nigeria, Mozambique, Iran, Indonesia, etc.)
Platform:	Online meeting platform (Zoom Webinar) with English-Japanese simultaneous interpretation

2) Objective of the Joint Seminars

The Joint Seminars targeted a wide range of officials involved in the water supply sector of both countries (and also several third countries). Three suitable themes were decided to get know each other by introducing their systems, various cases and efforts as well as to contribute to solving the challenges of both countries. Presenters from relevant municipalities and organizations suitable for the themes were proposed by SALGA, JWWA and JICA.

3) Programme of the Joint Seminars

The following table shows programme of the joint seminars.

Table 3-18: The 1st Joint Seminar Programme

Date	Presentation Tile and Presenter	Contents
Day-1 28th Jan. (Thu)	Facilitator Mr William Moraka (SALGA)	
	Outline and Introduction Mr Hideki OSAWA, Water Resources Group, Global Env. Dep't Japan International Cooperation Agency (JICA)	Outline of the Joint Seminars and introduction of presentations of Day-1 of the 1st seminar
	Presentation-1: Human resource development in water supply sector Ms Fikile TSHABANGU, Director: Municipal Capability & Gov. Cluster, South African Local Government Association (SALGA)	HRD policy and schemes by SALGA
	Presentation-2: Building municipal water engineering capacity and capability Mr Isaac NGWENYA, Coach/Mentor eThekwini Municipality	A case of engineering capacity building in Metro municipalities in South Africa
	Presentation-3: Human resource development and retention strategy Ms Kathleen HUSSEY, Assessment and Career Development Manager Johannesburg Water, City of Johannesburg	A case of HRD and retention strategy of water practitioners in Metro municipalities in South Africa
	Presentation-4: Talent management strategy implementation for skills attraction of scientist Ms Mpharu HLOYI, Manager: Scientific Services City of Cape Town	A case of HRD and acquisition of water quality specialists in Metro municipalities in South Africa
Day-2 29th Jan. (Fri)	Facilitator Mr Akinori Miyoshi (JICA Expert)	
	Outline and Introduction Mr Hideki OSAWA, Water Resources Group, Global Env. Dep't Japan International Cooperation Agency (JICA)	Outline of the Joint Seminars and introduction of presentations of Day-2 of the 1st seminar
	Presentation-1: Human Resources Development and Training for Waterworks Mr Akinori INAFUNE, Section Manager, Training Division Japan Water Works Association (JWWA)	Training and qualification courses provided by JWWA, and cooperative framework with municipalities for training implementation
	Presentation-2: Practical training in the Training and Technical Development Center Mr Eiji SAITO, Deputy Director, Training Section Bureau of Waterworks Tokyo Metropolitan Gov	Problem solution and efforts for HRD and skills succession and training facilities. Trainings in at Tokyo's Training and Technical Development Center
	Presentation-3: Skills and knowledge transfer in the water utility - Master engineer / Technical expert system Mr Kunito KATO, Manager of Technical Skill Succession Section, Human Resources Development Division Yokohama Waterworks Bureau	Problem solution and efforts for HRD and skills succession and training facilities. Skills and knowledge transfer by Yokohama's system

Table 3-19: The 2nd Joint Seminar Programme

Date	Presentation Tile and Presenter	Contents
Day-1 25th Feb. (Thu)	Facilitator Mr William Moraka (SALGA)	
	Outline and Introduction Mr Taisuke MORIMOTO, Representative, JICA South Africa Office Japan International Cooperation Agency (JICA)	Outline of the Joint Seminars and introduction of presentations of Day-1 of the 2nd seminar
	Presentation-1: Overview of disaster management in water services delivery Ms Phumla NGCUMSHE, Director: Water Macro Planning Department of Water and Sanitation (DWS)	Water sector's disaster (flood and drought) and its management by national department (DWS)
	Presentation-2: Experiences in drought management Mr Michael KILLICK, Director: Bulk Services, Water and Sanitation Department City of Cape Town	Drought management in Cape Town that experienced Day-Zero as a Metro municipality in drought-prone South Africa
	Presentation-3: Drought & COVID-19 Intervention Mr Sicelo PONGOMA, Manager: Water Services Authority Joe Gqabi District Municipality	Experiences and efforts in severe drought and COVID-19 by a typical inland rural municipality in drought-prone South Africa
Day-2 26th Feb. (Fri)	Facilitator Mr Akinori Miyoshi (JICA Expert)	
	Outline and Introduction Mr Hideki OSAWA, Water Resources Group, Global Env. Dep't Japan International Cooperation Agency (JICA)	Outline of the Joint Seminars and introduction of presentations of Day-2 of the 2nd seminar
	Presentation-1: Waterworks in Disaster-prone Japan - Mutual support system in the event of a disaster Mr Suguru WATANABE, Section Manager, International Division Japan Water Works Association (JWWA)	JWWA's regional offices, inter-municipality collaboration in case of emergency based on the "Manual for emergency countermeasure", disasters and countermeasures in the municipal water services, measures for ensuring effectiveness.
	Presentation-2: Water supply in Fukuoka City - Measures against drought and water saving Mr Yoichi MATSUO, Chief of Management & Planning Section General Affairs Department Fukuoka City Waterworks Bureau	Drought management and water saving by a large city's water utility, considering South African challenges
	Presentation-3: Measures against drought and water saving, and Amalgamation/regionalization of water services in Kagawa Prefecture Mr Mitsuhiro YOKOI, Section Manager, Planning Division Kagawa Water Supply Authority	Drought management and water saving by a regional water utility, and amalgamation/ regionalization of water services, considering South African challenges

Table 3-20: The 3rd Joint Seminar Programme

Date	Presentation Tile and Presenter	Contents
Day-1 18th March (Thu)	Facilitator Mr William Moraka (SALGA)	
	Outline and Introduction Mr Taisuke MORIMOTO, Representative, JICA South Africa Office Japan International Cooperation Agency (JICA)	Outline of the Joint Seminars and introduction of presentations of Day-1 of the 3rd seminar
	Message of support Mr Xolile GEORGE, Chief Executive Officer South African Local Government Association (SALGA)	Video message
	Presentation-1: Compliance to drinking water quality - a scientific approach Ms Phumza MATYOLO: Deputy Director, Scientific Nelson Mandela Bay Municipality	A case of drinking water quality monitoring in Metro municipalities in South Africa
	Presentation-2: Technological Innovation in enhancing drinking water quality Mr Thokozani MASEKO: Divisional Head Operations City of Ekurhuleni	A case of innovation for improvement in services delivery (use of app) in Metro municipalities in South Africa
	Presentation-3: Water Innovation Hub to enhance efficient water management Mr Mogan PADAYACHEE: Innovation Manager Rand Water	A case of innovation for water sector by the biggest water board in South Africa
Day-2 19th March (Fri)	Facilitator Mr Akinori Miyoshi (JICA Expert)	
	Outline and Introduction Mr Hideki OSAWA, Water Resources Group, Global Env. Dep't Japan International Cooperation Agency (JICA)	Outline of the Joint Seminars and introduction of presentations of Day-2 of the 3rd seminar
	Message of support Mr Ei YOSHIDA, Executive Director Japan Water Works Association (JWWA)	Video message
	Presentation-1: Procedures for the establishment and revision of the drinking water quality standards in Japan Mr Yasuaki SASAGAWA, Director, Water Quality Division Japan Water Works Association (JWWA)	How Japan's drinking water quality standards are formulated and how the latest scientific knowledge is reflected in the revision of the standards, and the role of related organizations
	Presentation-2: Water quality monitoring and control in Osaka City Ms Namiko NAKAMURA, Section Chief, Planning Department Osaka Municipal Waterworks Bureau	Water Safety Plan and HACCP, practical water quality control, remote monitoring of drinking water quality, and response to water contamination and offensive odor (including customer complaints)
	Presentation-3: Service connection quality assurance - City of Kawasaki - Mr Masayuki TSUKADA, Assistant Manager, Water Supply Equipment Section Waterworks Bureau, City of Kawasaki	A framework to ensure service connection quality nationwide. Lack of service connection quality assurance causes water leakage on service connections.

4) Registrants and Participants

The number of the final registrants for the three seminars was 593, and the total number of participants (panelists and attendees) was 1,092. This demonstrates the high level of interest of participants in the joint seminar. The following tables shows the details of participants sorted by panelists, countries and categories for each day, and also the percentage of actual attendees' participation to registrants.

The majority of participants were from government & institutes and municipalities of both countries, Japanese private companies and third countries' water utilities.

Table 3-21: Details of Participants of All Three Joint Seminars

Category			Final Regist-rants	The 1st Seminar		The 2nd Seminar		The 3rd Seminar		All Seminar Particip.
				Day-1 Particip.	Day-2 Particip.	Day-1 Particip.	Day-2 Particip.	Day-1 Particip.	Day-2 Particip.	
Panel.	South Africa		-	8	9	11	6	7	1	42
	Japan		-	9	13	10	13	11	14	70
	Total		-	**17**	**22**	**21**	**19**	**18**	**15**	**112**
Attendees	South Africa	Gov. & Institutes	97	23	17	27	16	14	21	118
		Municipalities	116	37	32	31	32	40	36	208
		Private	19	5	5	1	2	3	6	22
		Academia	2	0	0	0	0	0	0	0
		Media	1	1	0	0	0	0	0	1
		Sub-total	**235**	**66**	**54**	**59**	**50**	**57**	**63**	**349**
	Japan	Gov. & Institutes	84	30	30	32	24	16	14	146
		Municipalities	44	19	17	12	6	9	8	71
		Private	79	32	31	25	25	25	23	161
		Academia	12	5	3	7	5	4	2	26
		Media	1	1	1	0	0	0	0	2
		Sub-total	**220**	**87**	**82**	**76**	**60**	**54**	**47**	**406**
	3rd Country	Nigeria	92	17	21	20	16	39	47	160
		Mozambique	15	4	6	5	1	1	0	17
		Others	17	6	5	4	5	5	4	29
		Sub-total	**124**	**27**	**32**	**29**	**22**	**45**	**51**	**206**
	Other or Unknown		14	3	5	3	4	3	1	19
	Total		**593**	**183**	**173**	**167**	**136**	**159**	**162**	**980**
Grand Total			**-**	**200**	**195**	**188**	**155**	**177**	**177**	**1,092**

Table 3-22: Percentage of Actual Attendees' Participation to Registrants

Items	Final Regist-rants	The 1st Seminar		The 2nd Seminar		The 3rd Seminar		All Semi. Particip.
		Day-1 Particip.	Day-2 Particip.	Day-1 Particip.	Day-2 Particip.	Day-1 Particip.	Day-2 Particip.	
a. Attendees' Participation	-	183	173	167	136	159	162	980
b. Attendees' Registrants	593	357		448		539		-
a / b	-	**51%**	**48%**	**37%**	**30%**	**29%**	**30%**	-

5) Questionnaire Results

The result of the web-questionnaire after each day's seminar is summarized as shown in Figure 3-6 and Table 3-23. The attendees' satisfaction "Excellent: 70%" and "Good 22%" indicates that the attendees'

evaluation was high as a whole.

The reason why the satisfaction on Day-1 of the 1st seminar was relatively low seems to be due to the confusion of Zoom operations and functions and the lack of time by programming four presentations.

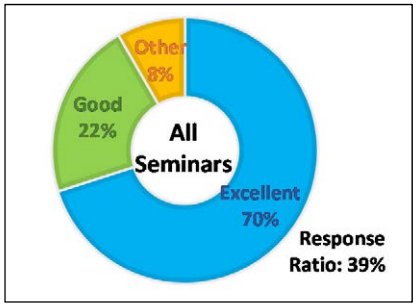


Figure 3-6: Attendees' Satisfaction of Seminars

Table 3-23: Attendees' Satisfaction Score

Items	The 1st Seminar		The 2nd Seminar		The 3rd Seminar		All Seminar (Total)
	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2	
Excellent	40(47%)	52(78%)	23(52%)	52(81%)	51(77%)	51(88%)	**269(70%)**
Good	30(35%)	15(22%)	17(39%)	11(17%)	5(8%)	5(9%)	**83(22%)**
Other	15(18%)	0(0%)	4(9%)	1(2%)	10(15%)	2(3%)	**32(8%)**
Answers	85	67	44	64	66	58	**384**
Attendees	183	173	167	136	159	162	**980**
Response Ratio	46%	39%	26%	47%	42%	36%	**39%**

6) Joint Seminar Brief

Refer to Appendix 4 for the joint seminar brief note.

3.5 Activity 1-5: Hold a seminar and share on the results of the baseline survey and benchmark with stakeholders.

The Project members attended and presented the National NRW Training including the results of the baseline survey and benchmarking in several national or provincial water sector seminars and forums and the SALGA's National Water & Sanitation Group meeting. The Project also convened the facilitator technical meetings (workshops), the National NRW Training output seminar and joint seminars with attendance of stakeholders.

Table 3-24 shows information sharing opportunities with stakeholders.

Table 3-24: Information Sharing Opportunities with Stakeholders

No	Title	Date	Participant
1	North West Province Water Summit	11th April 2019	Invited as a presenter
2	WCWDM Forum in Kwa-Zulu Natal Province	21st June 2019	Invited as a presenter
3	1st Facilitator Technical Meeting/Workshop	3rd-5th July 2019	28
4	2nd Facilitator Technical Meeting/Workshop	19th-20th Sep. 2019	24
5	NRW Training Output Seminar	6th March 2020	35
6	SALGA's National Water & Sanitation Group meeting	13th March 2020	20
7	WRC-SALGA Water Tech & Innovation Forum (Online)	28th September 2020	As a presenter (by SALGA)
8	3rd Facilitator Technical Meeting (Online)	20th-21st Oct. 2020	31
9	4th Facilitator Technical Meeting (Online)	12th November 2020	14
10	SALGA-JWWA Joint Seminars (Online)	January to March 2021	391 (South African participants only)

Chapter 4 Activities for Output 2 "IBTC's National NRW Training capacity is improved."

4.1 Activity 2-1: Prepare the National NRW Training Business Plan.

The Project prepared a business plan for the National NRW Training (note this does not include IBTC's business plan), and the 1st draft business plan was presented in the 3rd JCC meeting, then reviewed, finalized and approved in the 4th JCC meeting (refer to Appendix 5).

To conduct the National NRW Training, the plan covers all items such as stakeholders, business model, budgeting/funding, selection of the target municipalities, ensuring facilitators, training programme, implementation, monitoring & evaluation and public relations.

(1) Stakeholders to conduct the National NRW Training

The Project defined the stakeholders, their primary roles and responsibilities to conduct the National NRW Training as shown in Table 4-1.

Table 4-1: Primary Roles and Responsibilities of Stakeholders

Organization	Primary Responsibilities
DWS	● Implementation and O&M of the National NRW Training ● Training Manager, Quality Assurer, training management staff and so on ● Facilitators ● O&M cost
FETWater Group	● information sharing on qualification: Water Reticulation Practitioner ● Collaboration
SALGA	● Collaboration (dissemination, communication, publication) ● Coordination with municipalities
Municipality	● (Supporting) Facilitators ● Participants (learners) ● Workplaces with mentors/supervisors
Water Boards, MISA, WRC, CoGTA	● (Supporting) Facilitators ● Advises
LGSETA	● Funding for the National NRW National Training (Local Government related)
EWSETA	● Funding for the National NRW Training (Water Sector related)

Source: Business Plan for the National NRW Training, Version 1.0 (Draft)

(2) Proposed Business Model of the National NRW Training

As shown in Figure 4-1, the Project has proposed the business model of the National NRW Training which the above stakeholders participate in both the developing/operational side and the implementing/participating side, in terms of human resources (advisors, training managers, facilitators, mentors, participants/learners, etc.), physical resources (facilities, yard, equipment, etc.) and financial resources (DWS budget and SETA's grant).

Source: Business Plan for the NRW National Training, Version 1.0 (Draft)

Figure 4-1: Proposed Business Model on the National NRW Training

4.2 Activity 2-2: Prepare and take procedures for funding the National NRW Training.

Budget for the National NRW Training was prepared during the Project period.

(1) DWS Budget

Budget to conduct the National NRW Training in FY2019/20 and FY2020/21 was estimated in 10 million South African Rand (ZAR) in total. Five million each financial year was requested and approved. Budgeting in not ad-hoc but regular basis is a key to sustainability by training promotion and buy-in of the DWS's management and relevant directorates.

Table 4-2 shows national budget process of national Departments of South Africa including DWS in a financial year from April to March. Expenditures are estimated between November and January, and national budget is drawn up by the Cabinet in February.

Table 4-2: National Budget Process of National Departments of South Africa

Budget Process in Fiscal Year	4	5	6	7	8	9	10	11	12	1	2	3
1. Drawing												
2. Roll-over												
3. Annual Financial Statement												
4. Medium Term Expenditure Framework												
5. Adjusted Estimates of National Expenditure												
6. Revised Drawing												
7. Estimates of National Expenditure												

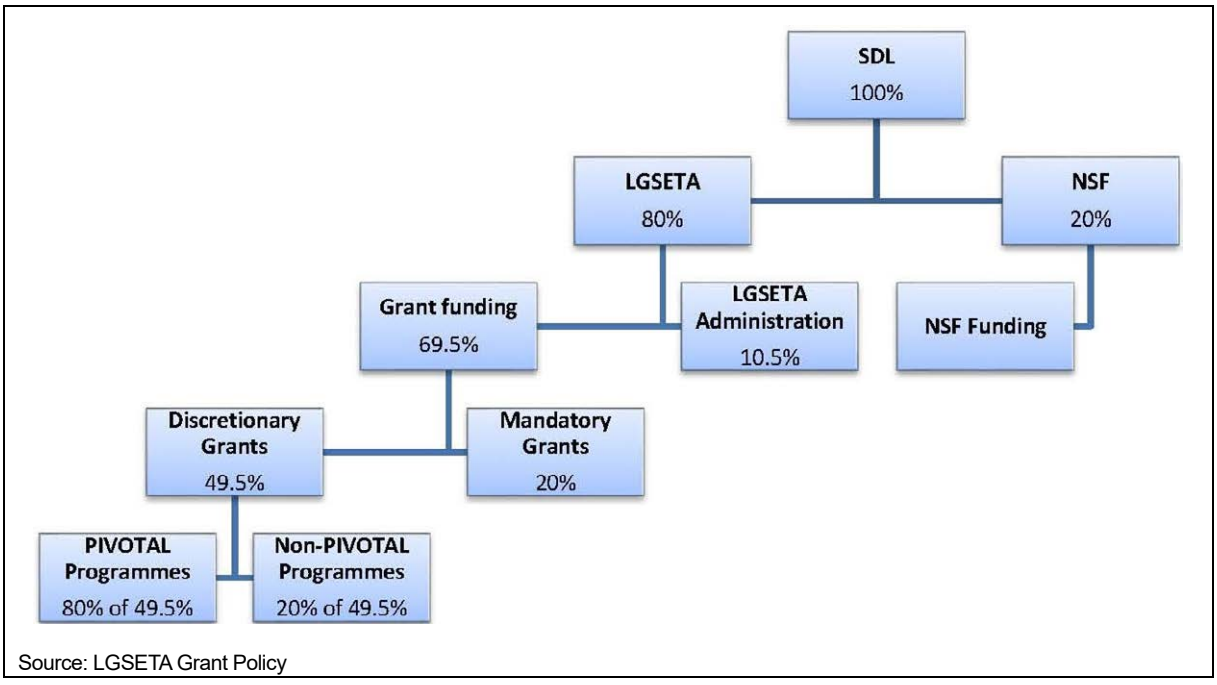
Source: Standard Budget Procedures, DWS

Municipality's financial year is from July to June. Units/sections/divisions submit estimates to finance unit/section/division in January and the annual budget is drawn up in June based on annual revenue estimation including local allocation tax, municipal levies, subsidies, equitable share fund, public service income and loan. Most of water services units/sections/divisions face difficulties in securing the budget as requested, and particularly small-scale municipalities cannot secure the adequate budget for human resources development.

(2) LGSETA Grant

Although the National NRW Training is not accredited by QCTO, the Project prepared a proposal in December 2018, briefed and updated LGSETA on the Training in order to apply the LGSETA grant for the practical training targeting municipalities' officials. LGSETA considered funding the Training by the Skills Programme scheme using the grant for accredited trainings, however this has been suspended because of extraordinary arrangement for the non-accredited training.

The Skill Programme scheme is under Discretionary Grants (refer to Figure 4-2).



Source: LGSETA Grant Policy

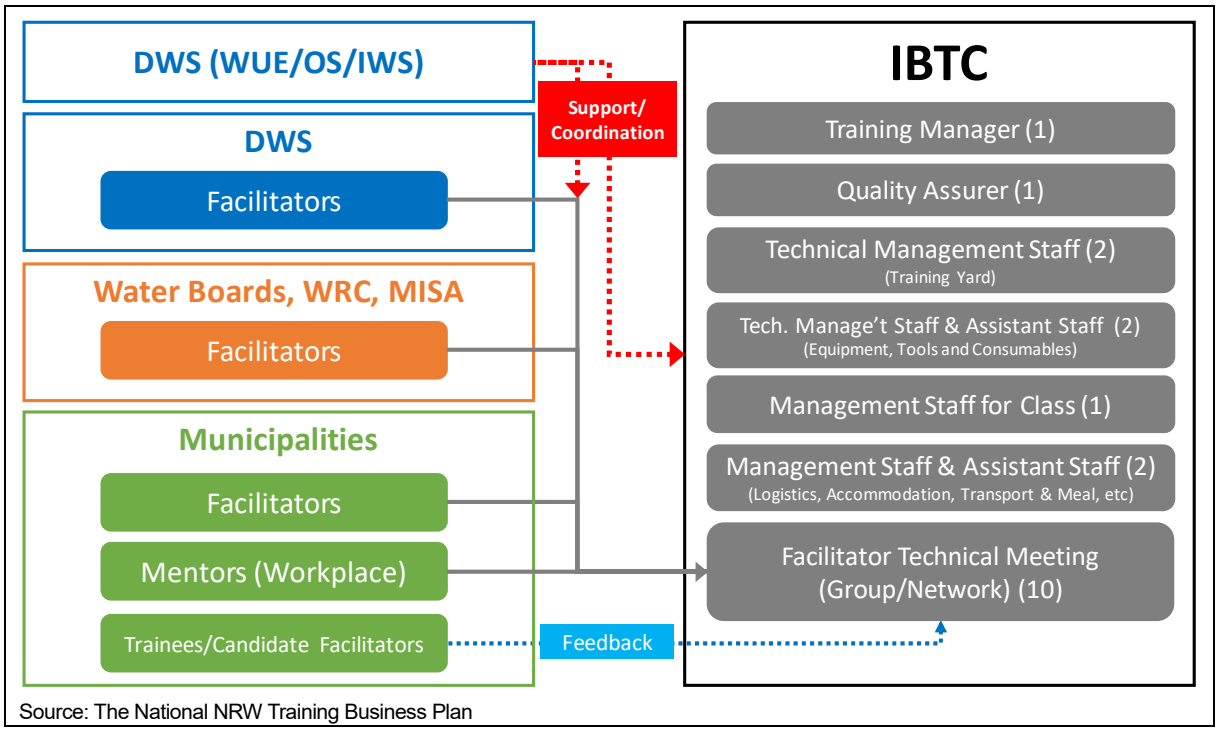
Figure 4-2: LGSETA Grant

To make the National NRW Training grantable and high status by strategic alignment with the newly-developed qualification "Water Reticulation Practitioner (WRP)", DWS/IBTC registered IBTC as an accredited assessment centre of the qualification and has taken the procedures of accredited skill development provision of the WRP qualification by making use of compatibility and experimental proof of the National NRW Training.

4.3 Activity 2-3: Prepare Terms of Reference for the National NRW Training.

As a part of the above Business Plan, the Project prepared terms of reference (TOR) for the National NRW Training, and the 1st draft was presented in the 3rd JCC meeting, then reviewed, finalized and approved in the 4th JCC meeting (refer to Appendix 5)..

The TOR describes the proposed organogram to conduct the National NRW Training as shown in Figure 4-3 and job description of each personnel except the existing training manager and quality assurer as shown in Table 4-3. For now, DWS/IBTC will continue to secure human resources by additional posting or personnel relocation because of the difficulty in employing full-time staff for the National NRW Training.



Source: The National NRW Training Business Plan

Figure 4-3: Proposed Organogram to conduct the National NRW Training

Table 4-3: Proposed Staff for the National NRW Training by IBTC

Staff (Number)		Job Description
1	Technical Management Staff for Training Yard (2 persons)	● Checking the condition of valves, a flow-meter, pressure gauge, customer meters, a storage tank, a line pump, etc. (Daily, Monthly and Yearly) ● Minor repair of pipelines, fittings, valves, flow-meter, customer meters, storage tank, etc. ● Cleaning of the training yard ● Operation of the valves and pump ● Calibration of flow meters and customer meters ● Estimate cost for procurement ● Assistance for security guards in security monitoring ● Other Tasks required
2	Technical Management Staff and Assistant Staff for Equipment, Tools and Consumables (1 person each, 2 persons in total)	● Checking the condition of control panel, leak detectors, tools, etc. ● Checking the connection of conductivity on equipment ● Battery charging for equipment ● Cleaning of the training yard ● Procurement of the pipes and their fittings ● Procurement of the spare parts of equipment ● Management of inventory for all the equipment (Daily, Monthly and Yearly) ● Assistance for security guards in security monitoring ● Procurement of fuel (if necessary)
3	Management Staff for Class (1 person)	● Checking the condition of AC, lights, projector, PC, furniture, etc. ● Arrangement of stationery such as white board, pens, note-pad ● Printing the hand-outs and deliver them ● Cleaning of the class facilities ● Dealing with lost & found
4	Management Staff and Assistant Staff for Logistics, Accommodation, Transport and Meal (1 person each, 2 persons in total)	● Arrangement and management for accommodation, transportation and meal ● Arrangement and management for cleaning of accommodation ● Arrangement and management of repairs in accommodation
5	IT Engineer (1 person)	● Launch of the official website of the IBTC ● O&M of the IBTC official website including periodic updating of the data and information on the site. ● Arrangement of the training using PC and internet

4.4 Activity 2-4: Prepare Standard Operation Procedures (SOP) of the National NRW Training.

The Project prepared the 1st draft of Standard Operation Procedures (SOP) consisting of the following items (refer to Appendix 6),

Processes and formats that were reviewed, executed and utilized in each step of the National NRW Training are compiled and recorded as the SOP, manuals and equivalent, consequently this capacitates IBTC in conducting the National NRW Training.

Most of the 1st draft's items were examined and prepared on the desk, and the SOP will be revised more practically through the activities of Output 3 "The National NRW Training is conducted with training improvement cycle." as described in the next section.

SOP Items

- Baseline survey
- Training programme development
- Selection/mobilization of facilitators and participating municipalities
- Facilitator technical meeting
- Development of learning/teaching materials
- Design and O&M of training yard
- Preparation of the training (administration and logistics)
- Implementation of the training
- Budgeting and grant application
- Monitoring and evaluation, etc.

4.5 Activity 2-5: Revise the SOP of the National NRW Training through the activities of Output-3.

To make the National NRW Training sustainable and practical, the Project revised the SOP by reflecting knowledge and lessons learnt from the acvities of Output 3 "The National NRW Training is conducted with training improvement cycle." for the Training and by adding formats and manuals as well as by conforming to the revised Business Plan (refer to Appendix 6).

Table 4-4 and Figure 4-4 show respectively, the revised SOP items and an annual programme specifying the process flow. It will be a key for DWS/IBTC to conduct the National NRW Training continuously in accordance with the annual programme.

Table 4-4: Reviewed SOP Items

1. ANNUAL PROGRAMME	
SOP: 1-1	Budget request and grant/funding application
SOP: 1-2	Budget and expenditure management
SOP: 1-3	Steering committee preparation/convening
SOP: 1-4	Annual programming and each group scheduling
2. MOBILIZATION AND ALLOCATION	
SOP: 2-1	DWS Coordinator allocation
SOP: 2-2	Facilitator engagement, selection and allocation
SOP: 2-3	Municipality selection and criteria
SOP: 2-4	Municipality mobilization
3. VENUE & LOGISTICS	
SOP: 3-1	Lecture/room preparation
SOP: 3-2	Logistics (accommodation, transport, catering)
SOP: 3-3	Training facility operation and improvement
4. MATERIALS	
SOP: 4-1	Teaching/learning materials development and revision
SOP: 4-2	Teaching/learning materials preparation/printing/copying
5. YARD & EQUIPMENT	
SOP: 5-1	Yard routine inspection and repair
SOP: 5-2	Equipment routine inspection, repair and control & management
SOP: 5-3	Yard/practices preparation
6. TRAINING	
SOP: 6-1	IBTC training implementation (admin)
SOP: 6-2	Workplace training implementation / Technical
SOP: 6-3	Workplace training implementation / Logistics & Admin
SOP: 6-4	Monitoring and evaluation for improvement plan
SOP: 6-5	Certification
7. INFO SHARING	
SOP: 7-1	Storage and information/data sharing
SOP: 7-2	Database (and web) development

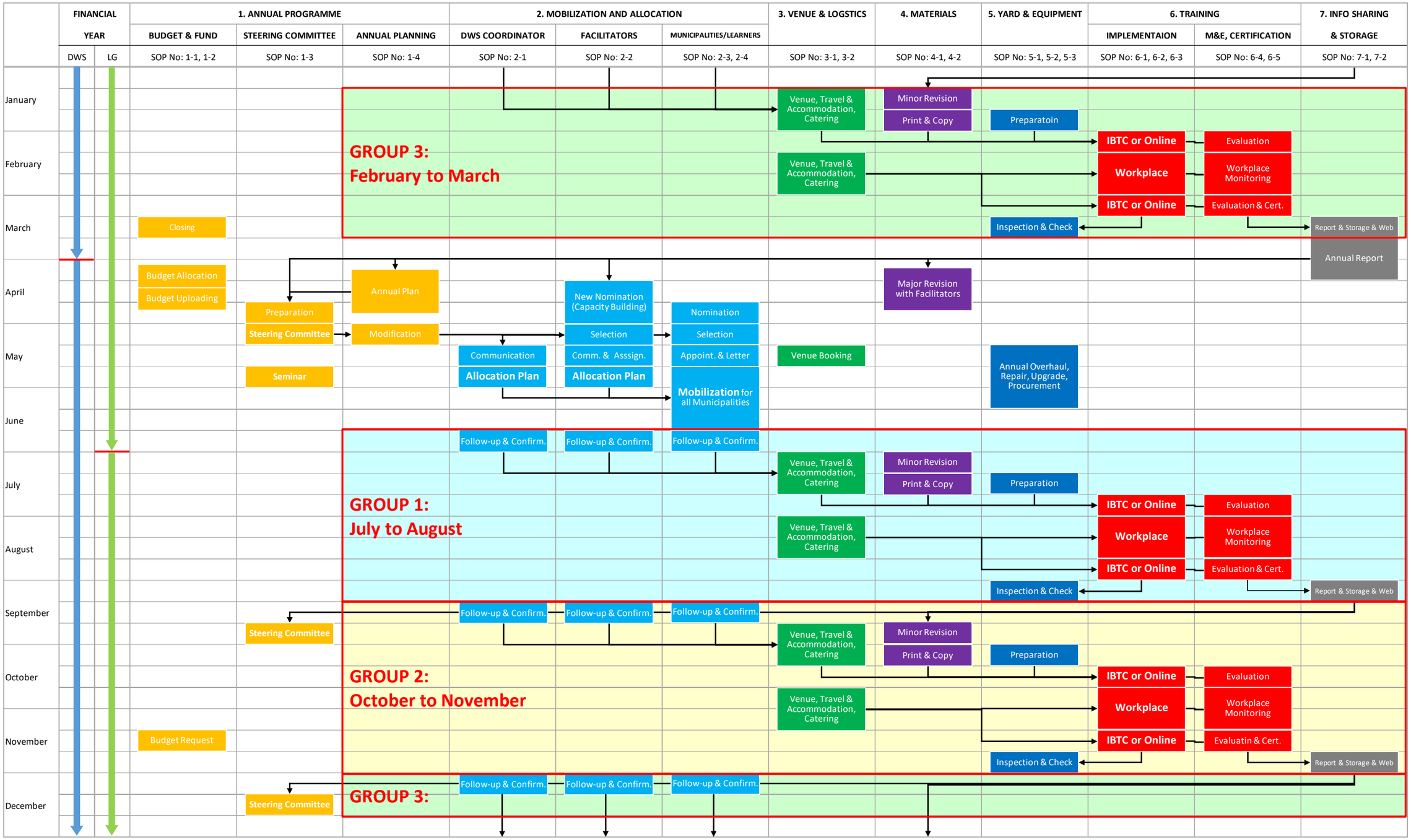


Figure 4-4: Annual Programme of the National NRW Training

4.6 Activity 2-6: Revise the National NRW Training Business Plan through the activities of Output-3.

To make the National NRW Training sustainable and practical, the Project revised the Business Plan as below by reflecting knowledge and lessons learnt from the activities of Output 3 "The National NRW Training is conducted with training improvement cycle." for the National NRW Training as well as by conforming to the revised SOP and terms of reference for a steering committee described in Chapter 4.9, furthermore by considering online system adaptation (refer to Appendix 5).

Contents the National NRW Training Business Plan

1. The National Non-Revenue Water (NRW) Training in the DWS Mandate
2. Purpose of the National NRW Training
3. Implementing Framework of the National NRW Training
   - 3-1. Proposed Business Model
   - 3-2. Roles and Responsibilities of DWS
   - 3-3. Proposed Organogram
4. Implementation Resources Plan for the National NRW Training
   - 4-1. Financial Plan
   - 4-2. Personnel Plan for IBTC
   - 4-3. Facilitator Securing Plan and Selection Criteria
5. Targets of the National NRW Training
   - 5-1. Learners
   - 5-2. Selection Criteria of the Target Participating Municipalities
6. Institutional Arrangement with Stakeholders
   - 6-1. Facilitators
   - 6-2.Target Participating Municipalities (Learners) and Workplace (Mentors)
7. Design Concepts, Outline of Training Curriculum and Implementation
   - 7-1. Design Concepts of the National NRW Training
   - 7-2. The National NRW Training Curriculum (Overview)
   - 7-3. Learning Materials
   - 7-4 .Training Yard and Equipment, and Operation and Maintenance
   - 7-5. Procurement of Goods/Consumables
   - 7-6. The National NRW Training Implementation
   - 7-7. Quality Assurance of Training Implementation
   - 7-8. Monitoring and Evaluation
   - 7-9. Reporting
   - 7-10. Implementation Plan
8. Sustainability of the National NRW Training
   - 8-1. Sustainability Master Plan
   - 8-2. Public Relations and Publication
   - 8-3. Network and Platform of Knowledge/Information Sharing
   - 8-4. Facilitator Recruiting/Developing System
   - 8-5. Middle- and Long-Term Monitoring and its Review
   - 8-6. Accreditation of The National NRW Training and other Water Related Qualification with the relevant SETAs
9. Funding Models of the National NRW Training

4.7 Activity 2-7: Conduct capacity assessment of IBTC.

Capacity of IBTC on the National NRW Training was developed by enhancement of the resources shown below Table 4-5 as well as by knowledge and lessons learnt and in the actual trainings, resulting in high ratio of learners' evaluation.

Table 4-5: Capacity Assessment of IBTC for the National NRW Training

No	Items	Initial	Current
1. Organizational Capacity			
1-1	Dedicated structure	None	No established but using existing structure with additional posting
1-2	Business plan	None	Prepared
1-3	SOP	None	Prepared
1-4	IBTC website	None	Developed in DWS's website
1-5	Online meeting platform	None	Microsoft Teams (DWS's standard)
1-6	Server	On-premise	On-premise (no change)
1-7	Internet and Email	Wired network	Wired network (no change)
2. Human Resources			
2-1	Full-time staff	Training manager: 1 Quality assurer: 1	a. Training manager: 1 b. Quality assurer: 1 c. Technical management staff for training yard and equipment each :2 (by additional posting) d. Management staff for class room: 1 e. Management staff for logistics and administration: 2 (by additional posting) f. IT staff: Directorate: IT if needed
2-2	Facilitator	None	20 from 9 municipalities and DWS
2-3	Coordinator	None	Allocated from IBTC and WUE as necessary
2-4	Learners	None	50 from 10 municipalities and DWS
3. Physical Resources			
3-1	Programme	None	Developed.
3-2	Facility	Class rooms and guest house	Class rooms, guest house and training yard for practical component
3-3	Equipment	None	Training equipment for practical and workplace components
3-4	Teaching/learning materials	None	Developed
4. Financial Resources			
4-1	DWS budget	None	ZAR 5 million per annum from the financial year 2019/20, 2020/21 and 2021/22
4-2	Grant (tuition)	None	DWS/IBTC has taken the procedures of accredited training provision of WRP qualification for grant application
4-3	Grant (accommodation, transport, NRW reduction activities in participating municipalities)	None	None (in the future)

4.8 Activity 2-8: Review and enhance IT environment for online system adaptation in accordance with the activities of Output 3.

In addition to development of the IBTC's website, the Project proposed online meeting platform and cloud storage for data sharing with internal/external persons involved. IT environment was enhanced or has been further reviewed as shown in Table 4-6 after discussions in regular project meetings, facilitator technical meetings, meeting with the DWS's relevant Directorates such as IT and Communication.

. **Table 4-6: Enhancement and Review of IT Environment**

items	Status
Website	● Developed in the DWS's website ● IBTC has discussed with the DWS's Directorate: Communication for improvement and public relations. ● The Project proposed draft contents and graphic image as a reference for commercializing the National NRW Training (refer to Appendix 7).
Online meeting platform	● Microsoft Teams (DWS's standard) ● IBTC has discussed with the DWS's Directorate: IT for procuring the account dedicated to IBTC.
Server	● On premise ● To share data files internally and externally, the Project proposed cloud storage (refer to Appendix 7). Furthermore, through experiences and lessons learnt in a series of project activities, IBTC has understood those necessity and usefulness, and has discussed with the relevant Directorates (Chief Information Officer) for enhancing ICT.
Internet and email	● Wired network ● IBTC has discussed with the relevant Directorates (Chief Information Officer) for enhancing internet and procuring the account dedicated to IBTC.

4.9 Activity 2-9: Develop sustainability plans for the National NRW Training.

(1) Sustainability Master Plan of the National NRW Training

The Project developed the Sustainability Master Plan of the National NRW Training for the post-Project three years to ensure sustainability (refer to Appendix 8), which consists of three pillars: "Administrative", "Training & development" and "Monitoring & evaluation". Additionally, JICA follow-up supports and the National NRW Programme (proposed) by conforming to the revised Business Plan and the annual programme of the National NRW Training (refer to Table 4-7).

Table 4-7: Contents of Sustainability Master Plan of the National NRW Training

No.	Strategic Action	Purpose and/or Outcome	Upper: Leader Lower: Supporter	Funding
PILLAR-1: ADMINISTRATIVE				
1-1	Governance structure (steering committee)	Functional governance structure (1st tier: SteerCom, 2nd tier: implementation forum)	DWS & SALGA Partners	DWS & SALGA
1-2	Steering committee task allocations as per the ToR	Allocation of roles and responsibilities	DWS & SALGA Partners	-
1-3	Funding instruments for post-project roll out (Business plan)	Funding proposal and/or partnership	DWS & SALGA Partners	DWS, SETAs
1-4	Engagement with Municipalities on the roll out plan	Buy in of Municipalities	SALGA & DWS Partners	SALGA & DWS
1-5	Engagement of local/international development (funding) partners	Neighboring countries, generating income, training SA community members who are interested in NRW	SALGA & DWS Partners	-
PILLAR-2: TRAINING & DEVELOPMENT				
2-1	Physical/online training	Physical/online training convened for identified municipalities with a report	DWS & SALGA Task members	DWS & partners
2-2	Workplace training	Workplace training conducted with a report	Munics & MISA DWS & SALGA	SALGA & partners
2-3	Master class on NRW (Knowledge sharing platform/programme)	Accredited master class convened (with CPD points)	SALGA Partners (IMESA, etc.)	SALGA & partners
2-4	Increasing the footprint of the National NRW Training	Training conducted in 5 major Provinces: GP, WC, KZN, EC and FS (anchors for network) with RW/UW. * LP, MP, NC, NW will be covered	SALGA Partners	SALGA & partners
2-5	Increasing the number of facilitators per Province	Number of accredited facilitators * IBTC will be in charge of "Facilitator/Assessor/Moderator" training provision to facilitators	SALGA & DWS JICA	EWSETA
2-6	Accreditation of the National NRW Training and related programmes	Water Reticulation Practitioner, Water Reticulation Management (additional if any)	DWS/IBTC Partners	DWS/IBTC
PILLAR-3: MONITORING & EVALUATION				
3-1	Undertaking formal evaluation of the projects	Impact analysis (from 2nd year), lesson learnt	Partners -	Partners
3-2	Monitoring & measuring instruments and systems in place	National NRW Dashboard (for high-level decision makers) and No-Drop *Also to be shown in website	DWS & SALGA Partners	DWS
3-3	Benchmarking indicators on NRW	Annual report on municipal benchmarking	SALGA & Munics DWS	SALGA & Munics
JICA FOLLOW-UP SUPPORTS				
J-1	Training programme in Japan	For training new facilitators, as well as for committee members to gain further knowledge on NRW and training	JICA Follow-up Team DWS & SALGA	JICA
J-2	Short-term support for workplace training in South Africa	To technically support 3rd workplace training in SA	JICA Follow-up Team DWS & SALGA	JICA
J-3	Monitoring (and evaluation) of the Training in South Africa	To monitor (and evaluate) the operation of the National NRW Training in SA.	JICA Long-term Expert to DBSA -	JICA
OTHERS: RELEVANT				
O-1	National NRW Programme (proposed)	Contribution to institutional interventions: Training & capacity building	SALGA-MISA-DBSA DWS	NT & Other sources

(2) Steering Committee of the National NRW Training

1) Purpose of Steering Committee

The purpose of the Steering Committee is to provide support, guidance, approval, endorsement, monitoring and oversight of the planning, implementation and review of the training programme according to the sustainability master plan with strategic actions and to the annual programme of the National NRW Training. The Steering Committee is also responsible for advising in budget planning and in grant application of the training programme for financial sustainability.

2) Terms of Reference of Steering Committee

To establish a steering committee for ensuring the sustainability of the National NRW Training programme, the Project prepared terms of reference (TOR) of the Steering Committee, which is composed of the following contents (refer to Appendix 8).

Contents of Terms of Reference (TOR)

- Chapter 1: Introduction
- Chapter 2: Goal and Objectives
- Chapter 3: Key Deliverables of the Steering Committee
- Chapter 4: Purpose of the Steering Committee
- Chapter 5: Governing Structure of the Steering Committee
- Chapter 6: Responsibilities of the Steering Committee Chair
- Chapter 7: Responsibilities of the Steering Committee Members
- Chapter 8: Membership
- Chapter 9: Generals
- Chapter 10: The Second Tier under the Committee
- Chapter 11: Confidentiality

3) Interim Steering Committee Meeting

The Project convened an interim meeting to explain background, purpose and TOR for prospective member organizations on 23rd March 2021.

Hereafter, DWS and SALGA will confirm commitment of member organizations and establish the Steering Committee officially through the DWS's formalities in May 2021 or later.

Chapter 5 Activities for Output 3 "The National NRW Training is conducted with training improvement cycle."

5.1 Activity 3-1: Design the National NRW Training based on the results of Output 1.

(1) Observation and Concept in designing the National NRW Training

Considering the observation obtained from the results of Output 1 "Skill development, status-quo and challenges of NRW, and needs in municipalities are analyzed and shared with stakeholders." and the status of existing qualifications (refer to Chapter 3.3 (4)), the Project designed the National NRW Training as a training to lead to problem solution of NRW in municipalities with the following concepts.

However, as mentioned in Chapter 4.2 (2), DWS/IBTC has promoted alignment with the newly-developed qualification WRP for skill development provision after the Project completion.

Observation

- A lot of municipalities have not conducted reliable accurate water balance analysis with reliable data and information on NRW.
- Prior to taking NRW reduction measures effectively, municipalities are still at the initial stage "Measuring and metering" for proper water balance analysis which leads to right planning.

Key Concept

- The National NRW Training "By municipalities, for municipalities", with support from DWS, SALGA and stakeholders.

Sub-Concepts

- Problem-solving oriented and flexible training programme with practicality for participating municipalities
- Targeting horizontal (cross-sectoral/unit) and vertical (superior-subordinate) participants as a team
- Training programme - participating municipalities to approach root causes of the problems in reticulation and NRW management
- Training programme - establishing the municipal working-level network and encouraging participants to take proactive actions.
- Training programme - leading to strategic/effective use of limited resources through prioritization
- Stakeholders' participatory/interactive Training programme organized by DWS and SALGA
- Sustainable training programme contributing to nationwide water services and capacity development by accumulating, sharing knowledge/information

(2) The National NRW Training Programme (Overview)

Training programme of the National NRW Training consists of the following module groups:

- Orientation and general overview

- Bulk meter knowledge and technique (including pipe fitting)
- Customer meter knowledge and technique
- Reticulation facility planning and O&M (valves, fire hydrant, air valves , etc.)
- Measurement planning
- Water balance analysis
- NRW reduction strategic planning and presentation
- Fundamental knowledge of active leak detection and equipment
- Fundamental knowledge of conditional assessment (as necessary)

(3) Duration of the National NRW Training Programme (Overview)

The Project designed the National NRW Training originally as a short course of net six (6) weeks duration.

The 1st Group Training

Stage 1: Knowledge and Practice (IBTC)	: 1 week (5 days)
Stage 2: Workplace (participating municipalities)	: 2 weeks (10 days)
Stage 3: Knowledge and Practice (IBTC)	: 1 week (5 days)
Stage 4: Workplace (participating municipalities)	: 2 weeks (10 days)

However, as a result of the 1st group training, the Project shortened the duration to net 3.5 weeks and revised the programme in consideration of routine works of learners in their municipalities and securing schedule of facilitators and DWS coordinators.

The 2nd Group Training

Stage 1: Knowledge and Practice (IBTC)	: 1 week (5 days)
Stage 2: Workplace (participating municipalities)	: 1 weeks (5 days)
Stage 3: Workplace (participating municipalities)	: 1 weeks (5 days)
Stage 4: Knowledge, Practice (if needed) and Wrap-up (IBTC)	: 0.5 week (3 days)

As shown in Figure 5-1, a programme flow in the 2nd group training has been the standard for the National NRW Training.

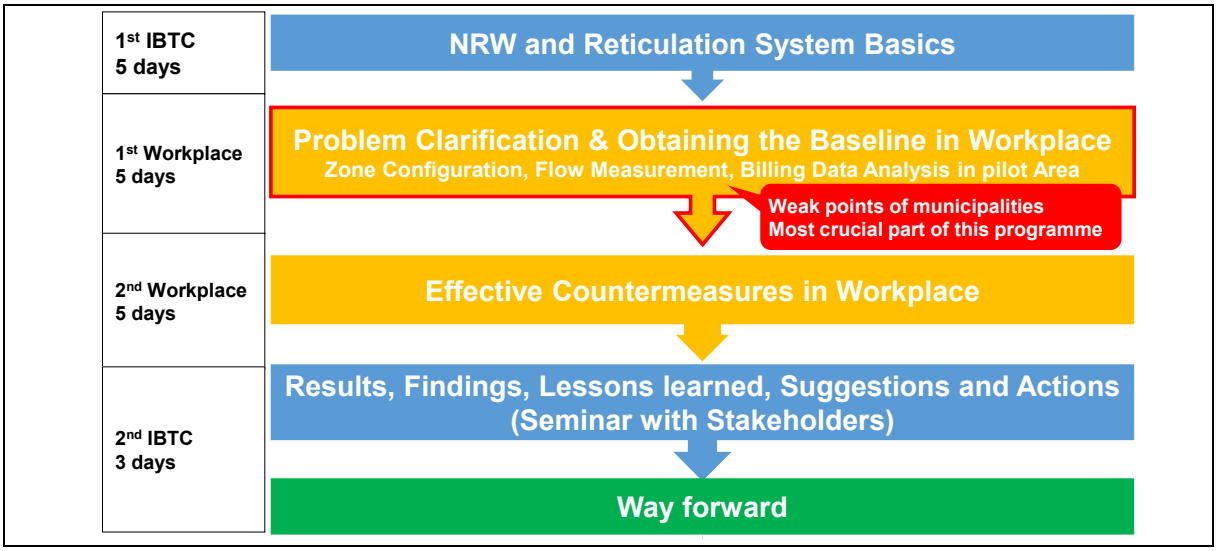


Figure 5-1: Conceptual Programme Flow of the National NRW Training

In line with online system adaptation under the COVID-19 circumstances, the Project kept the above programme flow and conducted the stage 1 only by shortening the duration in the 3rd group training.

The 3rd Group Training (online)

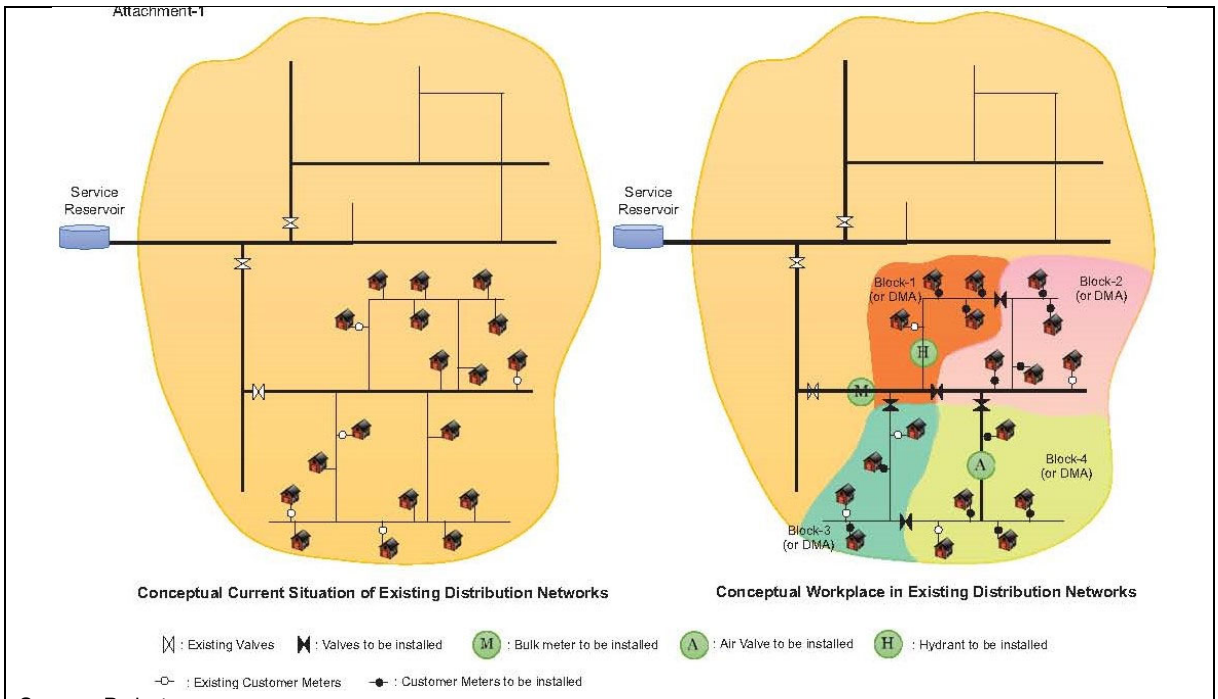
Stage 1: Knowledge and Practice (IBTC) : 0.8 week (4 half days)
Stage 2: Workplace (participating municipalities) : 1 weeks (5 days) *not conducted
Stage 3: Workplace (participating municipalities) : 1 weeks (5 days) *not conducted
Stage 4: Knowledge, Practice (if needed) and Wrap-up (TBD) : 0.5 week (3 days) *not conducted

(4) Modules of the National NRW Training Programme

Table 5-1 shows modules of the National NRW Training programme which should be customized flexibly based on participants' requirements and conditions.

In case the reticulation network is not in place for workplace training in participating municipalities, the following measures will be required. Figure 5-2 shows a conceptual model of the reticulation network suitable for workplace training.

- Installation of bulk flow meter
- Installation of valve, fire hydrant, air valve, etc.
- Setting up pilot District-Metered Area (DMA)
- Installation of customer meters



Source : Project

Figure 5-2: Conceptual Model of the Reticulation Network suitable for Workplace Training

Table 5-1: The National NRW Training Programme's Modules (1/5)

SN	Code	Theme	Sub-Theme	Item
1	0 - 1	ORIENTATION AND GENERAL OVERVIEW	I Self-Introduction: trainer	
2	0 - 2	ORIENTATION AND GENERAL OVERVIEW	I Self-Introduction: staff	
3	0 - 3	ORIENTATION AND GENERAL OVERVIEW	I Self-Introduction: trainee	
4	0 - 4	ORIENTATION AND GENERAL OVERVIEW	I What is water service – social and business aspect	
5	0 - 5	ORIENTATION AND GENERAL OVERVIEW	I What are the problems of water service in local government in SA	
6	0 - 6	ORIENTATION AND GENERAL OVERVIEW	I What is NRW and Why	
7	0 - 7	ORIENTATION AND GENERAL OVERVIEW	I Roadmap to problem solving – starting from" see your situation STRAIT" (: back bone of this training course)	
8	0 - 8	ORIENTATION AND GENERAL OVERVIEW	I Why are you here? – Purpose of this training course	
9	0 - 9	ORIENTATION AND GENERAL OVERVIEW	I Corse schedule	
10	1 - 10	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I Why are bulk meters needed	General overview of water reticulation in city and town
11	1 - 11	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I Why are bulk meters needed	Vicious cycle of water service(reticulation system) – arise issues: mishandling when the time of water shortage, unprecedent pipe burst, nothing progress by unplanned work, distrusted by customers…
12	1 - 12	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I Why are bulk meters needed	How to know your water reticulation condition—compare to the initial master plan
13	1 - 13	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I Function of bulk meter	Varieties of bulk meters
14	1 - 14	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I Function of bulk meter	Function of each bulk meters
15	1 - 15	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I Function of bulk meter	Each good points and disadvantages
16	1 - 16	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I Function of bulk meter	Cost
17	1 - 17	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to operate the bulk meter(including maintenance and security tips)	
18	1 - 18	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I What is it like actual bulk inflow (feature of : Time - Flow late, Pressure)	
19	1 - 19	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to check bulk meter working properly	Overview
20	1 - 20	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to check bulk meter working properly	Installation
21	1 - 21	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to check bulk meter working properly	Maintenance
22	1 - 22	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to check bulk meter working properly	Others
23	1 - 23	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to check bulk meter working properly	Drills – installation of each types of bulk meter (confirmation&positioning&fitting)
24	1 - 24	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to check bulk meter working properly	Drills – experiment: water flow rate and data accuracy
25	1 - 25	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to check bulk meter working properly	Drills – experiment: improper installation and data accuracy
26	1 - 26	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to check bulk meter working properly	Drills – discussion: sharing experiences of bulk meter issue (from the case of each participant's municipality)
27	1 - 27	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to use bulk meter for reducing NRW	Overview
28	1 - 28	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to use bulk meter for reducing NRW	Making DMA
29	1 - 29	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to use bulk meter for reducing NRW	"DANKAKU" -- dividing method of DMA; know Water Balances in each small DMAs
30	1 - 30	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to use bulk meter for reducing NRW	Drills – Do "DANKAKU (断水区画) " method on the map
31	1 - 31	1. BULK METER KNOWLEDGE, TECHNIQUE (INCLUDING PIPE FITTING)	I How to use bulk meter for reducing NRW	Monitoring the data (MNF)
32	2 - 1	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I Why are customer meters needed	General overview of customer meters—the role
33	2 - 2	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I Why are customer meters needed	Virtuous cycle of local government's water service – from the business aspect
34	2 - 3	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I Why are customer meters needed	Relation with customers
35	2 - 4	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I Function of customer meter	Varieties of customer meters
36	2 - 5	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I Function of customer meter	Function of each customer meters
37	2 - 6	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I Function of customer meter	Each good points and disadvanteges
38	2 - 7	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I Function of customer meter	Cost
39	2 - 8	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I Function of customer meter	Drills – understand the function of each types of customer meter
40	2 - 9	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I How to operate customer meters	How to know actual water consumption?
41	2 - 10	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I How to operate customer meters	How to check customer meters working properly?
42	2 - 11	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I How to operate customer meters	Installation
43	2 - 12	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I How to operate customer meters	Maintenance
44	2 - 14	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I How to operate customer meters	Drills – installation of each types of customer meter (confirmation&positioning&fitting)
45	2 - 15	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I How to operate customer meters	Drills – experiment: improper installation and data accuracy
46	2 - 16	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	General overview
47	2 - 17	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Awareness for value of water
48	2 - 18	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Awareness for amount of water usage

Table 5-1: The National NRW Training Programme's Modules (2/5)

SN	Code	Theme	Sub-Theme	Item
49	2 - 19	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Find leakage within the premises
50	2 - 20	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Collect data and analyse water flow (even not billing)
51	2 - 21	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Find illegal connection
52	2 - 22	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Grasp tendency of consumption per capita for each land use (basic data for future development plan)
53	2 - 23	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Drills – discussion: sharing experiences of customer meter trouble (from the case of each participant's municipality)
54	2 - 24	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Drills – discussion: sharing FBW policies of each Municipalities and how to do handling actually (from the case of each participant's municipality)
55	2 - 25	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Drills – discussion: sharing experiences of illegal connection (from the case of each participant's municipality)
56	2 - 26	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Drills – making illegal connection case book (from the case of each participant's municipality)
57	2 - 27	2. CUSTMER METER KOWLEDGE, TECHNIQUE	I how to use customer meter for reducing NRW	Drills – making illegal connection(conditions: not same as other members)
58	3 - 1	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I What is the layout should be as a water reticulation system?	General overview
59	3 - 2	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I What is the layout should be as a water reticulation system?	Geographical features
60	3 - 3	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I What is the layout should be as a water reticulation system?	Land use situation
61	3 - 4	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I What is the layout should be as a water reticulation system?	Follow to the city development plan
62	3 - 5	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I What is the layout should be as a water reticulation system?	Love your reticulation
63	3 - 6	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	General overview
64	3 - 7	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	Reservoirs
65	3 - 8	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	Pipes
66	3 - 9	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	Valves
67	3 - 10	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	PRVs
68	3 - 11	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	Scours valve (filter valve, drainage valve)
69	3 - 12	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	Air valves
70	3 - 13	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	Fire hydrants
71	3 - 14	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	Meters
72	3 - 15	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	Drills – understand each facility's function/dismantle
73	3 - 16	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	Drills -- how to use it
74	3 - 17	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Function of water service facilities, its Ideal position and setups	Drills -- how to maintain it
75	3 - 18	3. RETICULATION FACILITY PLANNING, O&M (VALVES, FIRE HYDRANT, AIR VALVES, ETC.)	I Drills – on the map training – discuss actual cases	Drills-- on the map training – discuss actual cases & Simple Reticulation Analysis
76	4 - 1	4. MEASUREMENT PLANNING	I Why measurement is needed	
77	4 - 2	4. MEASUREMENT PLANNING	I Which points of reticulation should be measured -- prioritise	
78	4 - 3	4. MEASUREMENT PLANNING	I Measurement planning – setup service facilities in reticulation	
79	4 - 4	4. MEASUREMENT PLANNING	I Drills – on the map training using actual cases	Drills -- on the map training using actual cases with a knowledge of Simple Reticulation Analysis
80	4 - 5	4. MEASUREMENT PLANNING	I Drills – how to know shutting valves	
81	5 - 1	5. DATA LOGGING AND ANALYSIS	I Why do you log the data?	General overview
82	5 - 2	5. DATA LOGGING AND ANALYSIS	I Why do you log the data?	Varieties of purpose for logging
83	5 - 3	5. DATA LOGGING AND ANALYSIS	I How to log?	Varieties of logging system
84	5 - 4	5. DATA LOGGING AND ANALYSIS	I How to log?	Good points and disadvantages of each system
85	5 - 5	5. DATA LOGGING AND ANALYSIS	I How to log?	What are important points of logging?
86	5 - 6	5. DATA LOGGING AND ANALYSIS	I How to log?	Drills – how to use loggers
87	5 - 7	5. DATA LOGGING AND ANALYSIS	I How to log?	Drills – how to maintain loggers
88	5 - 8	5. DATA LOGGING AND ANALYSIS	I How to log?	Drills – logging & Simple Reticulation Analysis
89	5 - 9	5. DATA LOGGING AND ANALYSIS	I How to analyse the data	General overview
90	5 - 10	5. DATA LOGGING AND ANALYSIS	I How to analyse the data	Varieties of analysis
91	5 - 11	5. DATA LOGGING AND ANALYSIS	I How to analyse the data	Fundamental knowledge of database making
92	5 - 12	5. DATA LOGGING AND ANALYSIS	I How to analyse the data	How to organize the data?
93	5 - 13	5. DATA LOGGING AND ANALYSIS	I How to analyse the data	What are important points of analysis?

Table 5-1: The National NRW Training Programme's Modules (3/5)

SN	Code	Theme	Sub-Theme	Item
94	5 - 14	5. DATA LOGGING AND ANALYSIS	I How to analyse the data	Drills – making database table
95	5 - 15	5. DATA LOGGING AND ANALYSIS	I How to analyse the data	Drills – analysis: reading data to making water balance
96	6 - 1	6. WATER BALANCE ANALYSIS	I Why water balance is needed?	
97	6 - 2	6. WATER BALANCE ANALYSIS	I What are water balance consists of?	
98	6 - 3	6. WATER BALANCE ANALYSIS	I How to make water balance?	
99	6 - 4	6. WATER BALANCE ANALYSIS	I How to make water balance?	Bulk input(system input)
100	6 - 5	6. WATER BALANCE ANALYSIS	I How to make water balance?	Consumption
101	6 - 6	6. WATER BALANCE ANALYSIS	I How to make water balance?	Errors
102	6 - 7	6. WATER BALANCE ANALYSIS	I How to make water balance?	How to deal with unmetered consumption?
103	6 - 8	6. WATER BALANCE ANALYSIS	I How to make water balance?	Consumption from unmetered connection
104	6 - 9	6. WATER BALANCE ANALYSIS	I How to make water balance?	Free basic water
105	6 - 10	6. WATER BALANCE ANALYSIS	I How to make water balance?	Leakage
106	6 - 11	6. WATER BALANCE ANALYSIS	I How to make water balance?	Illegal consumption
107	6 - 12	6. WATER BALANCE ANALYSIS	I How to make water balance?	Drills – making water balance
108	6 - 13	6. WATER BALANCE ANALYSIS	I How to make water balance?	Drills – Discussion: case study (from the case of each participant)
109	6 - 14	6. WATER BALANCE ANALYSIS	I Non-revenue water	What is non-revenue water?
110	6 - 15	6. WATER BALANCE ANALYSIS	I Non-revenue water	Drills – how to decipher water balance – meaning of its real situation
111	7 - 1	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is strategy?	What is strategy?
112	7 - 2	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is strategy?	Why strategy is needed?
113	7 - 2	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is strategy?	How to make strategy?
114	7 - 3	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is strategy?	Interventions for reducing NRW
115	7 - 4	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is strategy?	How to make strategy for reducing NRW?
116	7 - 5	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is strategy?	Drills – to select interventions and build up the logic of strategy for NRW
117	7 - 6	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is Plan?	What is plan?
118	7 - 7	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is Plan?	Why is plan needed?
119	7 - 8	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is Plan?	Varieties of Plan
120	7 - 9	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is Plan?	How to make Plans?
121	7 - 10	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is Plan?	How to make plans for reducing NRW?
122	7 - 11	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is Plan?	Drills – making NRW strategy into project plan
123	7 - 12	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is Plan?	Drills – making project schedule
124	7 - 13	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is presentation?	General overview
125	7 - 14	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is presentation?	Why are presentation important? (get funds, get project approval, work efficiently as a team, mentorship, etc)
126	7 - 15	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is presentation?	The way of presentation
127	7 - 16	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is presentation?	Oral (one by one)
128	7 - 17	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is presentation?	Oral (meeting)
129	7 - 18	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is presentation?	By paper
130	7 - 19	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is presentation?	By screen
131	7 - 20	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I What is presentation?	Drills – make a presentation material
132	7 - 21	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I How to prepare a presentation material?	General overview
133	7 - 22	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I How to prepare a presentation material?	Tips for using Power point
134	7 - 23	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I How to prepare a presentation material?	Editing photos quick and nicely
135	7 - 24	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I How to prepare a presentation material?	Using graphs quick and nicely
136	7 - 25	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I How to prepare a presentation material?	Tips for making handouts
137	7 - 26	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I How to prepare a presentation material?	Tips for using Word for making short report
138	7 - 27	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I How to make a presentation to get approval for NRW reduction project?	

Table 5-1: The National NRW Training Programme's Modules (4/5)

139	7	-	28	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I How to make a presentation to get approval for NRW reduction project?	Drills – action learning: give a presentation to all participants
140	7	-	29	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I How to make a presentation to get approval for NRW reduction project?	Drills – reflection: feedback from the presentation session
141	7	-	30	7. NRW REDUCTION STRATEGY PLANNING & PRESENTATION	I How to make a presentation to get approval for NRW reduction project?	Communication tips
142	8	-	1	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Why active leakage detection is needed?	What is active leakage detection?
143	8	-	2	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Why active leakage detection is needed?	When is the best time to start active leakage detection?
144	8	-	3	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Why active leakage detection is needed?	Varieties of active leakage detection
145	8	-	4	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What are the equipment of active leakage detection?	Acoustic bar
146	8	-	5	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What are the equipment of active leakage detection?	Correlator
147	8	-	6	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What are the equipment of active leakage detection?	Multi-channel Correlator
148	8	-	7	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What are the equipment of active leakage detection?	Amplifier
149	8	-	8	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What are the equipment of active leakage detection?	Drills – understand each equipment's function
150	8	-	9	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What are the equipment of active leakage detection?	Drills -- how to use it
151	8	-	10	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What are the equipment of active leakage detection?	Drills -- how to maintain it
152	8	-	11	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Setup DMA
153	8	-	12	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Select deep dive area -- using DANKAKU method
154	8	-	13	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Drills – do DANKAKU and select the focus area
155	8	-	14	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Using acoustic bar
156	8	-	15	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Using Correlator, Multi-channel Correlator
157	8	-	16	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Using Amplifier
158	8	-	17	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Excavation and identify the leak
159	8	-	18	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Repairing work
160	8	-	19	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Keep record – accumulate data
161	8	-	20	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Take action to next step to analyse the data
162	8	-	21	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I What is the procedure of active leakage detection?	Drills – find water loss and taking data
163	8	-	22	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	General overview
164	8	-	23	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	DMA
165	8	-	24	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Reservoirs
166	8	-	25	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Pressure
167	8	-	26	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Flow
168	8	-	27	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Pipes
169	8	-	28	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Valves
170	8	-	29	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Air valves
171	8	-	30	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Fire hydrants
172	8	-	31	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Drain facility
173	8	-	32	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Meters
174	8	-	33	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Drills – problem solving of each facilities
175	8	-	34	8. FUNDAMENTAL KNOWLEDGE OF ACTIVE LEAKAGE EQUIPMENT, THEORY*	I Active leakage detection and reticulation O&M – maintenance point from the view of reducing NRW	Drills – discussion: experience of each participant
176	9	-	1	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I Why conditional assessment is needed?	What is conditional assessment?
177	9	-	2	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I Why conditional assessment is needed?	Effect of condition to the water service facilities

Table 5-1: The National NRW Training Programme's Modules (5/5)

178	9	-	3	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I Why conditional assessment is needed?	Effectiveness of conditional assessment
179	9	-	4	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to do conditional assessment?	Criteria for water service facility (focus on pipe facility)
180	9	-	5	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to do conditional assessment?	Type(material)
181	9	-	6	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to do conditional assessment?	Age
182	9	-	7	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to do conditional assessment?	Soil
183	9	-	8	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to do conditional assessment?	Depth
184	9	-	9	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to do conditional assessment?	Traffic
185	9	-	10	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to do conditional assessment?	History of repairing work(when, where, who, why, how, how many,leagal life)
186	9	-	11	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to do conditional assessment?	Performance(disturbing flow, reducing thickness, hardening, swelling, frequency of leakage)
187	9	-	12	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to assess?	Collecting data
188	9	-	13	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to assess?	Making data table
189	9	-	14	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to assess?	Analysis
190	9	-	15	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to reflect to Long-term plan	General overview
191	9	-	16	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to reflect to Long-term plan	Perspective from the finance
192	9	-	17	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to reflect to Long-term plan	Perspective from the number of staff
193	9	-	18	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to reflect to Long-term plan	Perspective from the service level
194	9	-	19	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to reflect to Long-term plan	Perspective from the impact level to interrupt social activities
195	9	-	20	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to reflect to Long-term plan	Drills – prepare conditional assessment data table
196	9	-	21	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to reflect to Long-term plan	Drills – analysing and making strategy
197	9	-	22	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I How to reflect to Long-term plan	Drills – making long-term plan
198	9	-	23	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I From where funded to the project?	General overview
199	9	-	24	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I From where funded to the project?	DWS scheme
200	9	-	25	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I From where funded to the project?	Funding from funding agency
201	9	-	26	9. FUNDAMENTAL KNOWLEDGE OF CONDITIONAL ASSESMENT *	I From where funded to the project?	Drills – making funding plan based on the long-term plan

(5) Alignment with new qualification "Water Reticulation Practitioner (WRP)"

The Project prepared and conducted the National NRW Training with a view to align new qualification "Water Reticulation Practitioner (WRP)" for sustainability of the Training as below:

- Information sharing and compatibility of programme and learning/teaching materials
- Synergetic use of IBTC (facilities, yard and equipment) for assessment and skill development provision of WRP.
- Positioning the National NRW Training as a model case of practical training with outcomes

As described in Chapter 4.2 (2), DWS/IBTC registered IBTC as an accredited assessment centre of the qualification and has taken the procedures of accredited skills development provision of the qualification by taking advantage of compatibility and experimental proof of the National NRW Training. DWS/IBTC intends to secure funding opportunity and enhance the status of the National NRW Training by strategic alignment with the qualification.

5.2 Activity 3-2: Secure the participating municipalities and site(s) for workplace of the National NRW Training.

Through the official protocol of DWS or SALGA, the Project mobilized municipalities to participate in the National NRW Training for their staff as learners and secure workplaces in the municipalities, namely the pilot District Metered Area (DMA).

Mobilization of participating municipalities consists of letter issuance from DWS, visit and explanation to water-related managers (sometimes field visit to the candidate pilot DMA), and following up to confirm their interests and learners' participation.

(1) Selection Criteria of the Participating Municipalities and Learners

The Project prepared selection criteria of the participating municipalities and learners in mobilization as below. This was finalized as a part of the National NRW Training Business Plan (refer to Appendix 5).

Selection Criteria of the Participating Municipalities

A training group/intake of the National NRW Training targets 2 to 4 municipalities.

- Higher NRW and its ratio
- Capacity to provide safe and stable water supply by conventional piped scheme(s)
- Mapping of reticulation system (with accuracy by regular updates)
- Reliable digital billing data (with accuracy)
- Having a Water Services Development Plan (WSDP)
- Municipality's vision/policy/plan and ongoing efforts in tackling NRW (if any)
- Affordability to allocate 3 to 6 staff (group) during the whole training period

Selection Criteria for Learners

The participation in a training group/intake is limited to 3 to 6 trainees as a team from each municipality (12 to 18 learners in total), who are superintendents/supervisors/forepersons/site-managers, artisan plumbers, assistant / general workers, and also engineers and technologists on an as-needed basis from the following divisions/sections/units:

- Water conservation and water demand management (WCWDM)
- Operation and maintenance (O&M) or equivalent

Also, the NRW Training targets the following staff of Municipalities for example, who have accumulated a certain amount of education, knowledge, experience and expertise:

- Technician (or Technician-to-be) or equivalent
- Superintendent/Supervisor/Foreperson/Site-Manager (or Superintendent/Supervisor/Foreperson/Site-Manager-to-be) or equivalent
- Artisan plumber (or Artisan plumber-to-be) or equivalent
- Assistant / General Worker or equivalent

(2) Shortlist of the Participating Municipalities

The Project shortlisted the participating municipalities to be targeted in terms of NRW volume and ratio by using the DWS's No-Drop Assessment data (refer to Table 5-2).

Table 5-2: Shortlist of the Participating Municipalities

Municipalities		Cate-gory	System Input Volume (m^3/a)	NRW (m^3/a)	NRW %
JHB	City of Johannesburg	A	578,391,853	221,839,414	38.4%
ETH	eThekwini	A	325,289,460	132,146,790	40.6%
EKU	Ekurhuleni	A	363,964,110	125,859,904	34.6%
TSH	City of Tshwane	A	351,883,407	91,687,735	26.1%
CPT	City of Cape Town	A	329,003,716	73,031,874	22.2%
DC42	Sedibeng DM	C1	118,791,917	65,035,524	54.7%
DC33	Mopani DM	C2	109,841,103	63,576,256	57.9%
GT421	Emfuleni	B1	98,140,532	58,988,859	60.1%
NMA	Nelson Mandela Bay	A	115,476,923	53,337,617	46.2%
DC31	Nkangala DM	C1	113,783,173	50,051,289	44.0%
DC32	Ehlanzeni DM	C1	88,733,851	49,866,460	56.2%
DC37	Bojanala Platinum DM	C1	96,115,472	43,829,627	45.6%
DC23	Uthukela DM	C2	51,715,800	34,550,752	66.8%
DC35	Capricorn DM	C2	64,442,198	34,265,938	53.2%
KZN225	The Msunduzi	B1	71,398,543	33,833,690	47.4%
BUF	Buffalo City	A	66,792,119	31,061,907	46.5%
MP326	Mbombela	B1	52,684,434	30,635,933	58.1%
DC40	Dr Kenneth Kaunda DM	C1	51,902,307	30,237,181	58.3%
DC30	Gert Sibande DM	C1	68,473,689	29,934,742	43.7%
MAN	Mangaung	A	72,306,705	29,606,739	40.9%
DC19	Thabo Mofutsanyane DM	C1	44,582,411	27,420,067	61.5%
MP312	Emalahleni	B1	48,017,663	27,339,435	56.9%
LIM333	Greater Tzaneen	B4	43,271,809	25,877,087	59.8%
DC34	Vhembe DM	C2	46,896,628	25,829,474	55.1%
NW373	Rustenburg	B1	52,471,859	24,616,822	46.9%
DC48	West Rand DM	C1	60,069,413	24,416,963	40.6%
DC18	Lejweleputswa DM	C1	46,967,637	23,759,433	50.6%
DC38	Ngaka Modiri Molema DM	C2	42,635,677	23,473,621	55.1%
DC21	Ugu District DM	C2	41,821,103	23,309,333	55.7%
DC26	Zululand DM	C2	34,332,616	22,623,825	65.9%
LIM354	Polokwane	B1	42,527,444	22,131,242	52.0%
DC9	Frances Baard DM	C1	40,625,222	21,685,909	53.4%

(3) Participating Municipalities during the Project Period (as a result of Mobilization)

To lead to a successful experience of the National NRW Training, the Project referred to the above shortlist of participating municipalities as well as examined other-than-shortlisted municipalities, comprehensively in consideration of geographical conditions such as access, balance among Provinces, advices from DWS Provincial Offices, municipality's financial situation (affecting their participation), etc.

As a result, the Project nominated the municipalities shown in Table 5-3 and carried out mobilization, and 10 municipalities who indicated their interests participated in the National NRW Training during the Project period.

Mobilization was not conducted physically for the participating municipalities in the 3rd group training under the COVID-19 circumstances. Therefore, the pilot DMAs were not secured because the Training was limited to online manner mainly for knowledge.

Table 5-3: List of Participating Municipalities

No	Name	Province	Mobilization Visit Date
1st Group Training			
1	Mogale City Local Municipality	Gauteng	13th July 2019
2	Mopani District Municipality	Limpopo	18th July 2019
3	uMgungundlovu District Municipality	Kwa-Zulu Natal	18th July 2019
2nd Group Training			
1	Metsimaholo Local Municipality	Free State	14th November 2019
2	Mbombela Local Municipality	Mpumalanga	18th November 2019
3	JB Marks Local Municipality	North West	27th November 2019
4	King Cetshwayo District Municipality	Kwa-Zulu Natal	17th January 2020
3Rd Group Training (online only)			
1	Amathole District Municipality	Eastern Cape	October 2020 (by email)
2	Saldanha Local Municipality	Western Cape	October 2020 (by email)
3	City of Ekurhuleni (Metro)	Gauteng	October 2020 (by email)

Remarks: George Local Municipality declined due to municipality's matter in the 1st group training.
Sol Plaatje Local Municipality declined due to municipality's matter in the 1st group training.

Figure 5-3 shows location of the participating municipalities (workplace).

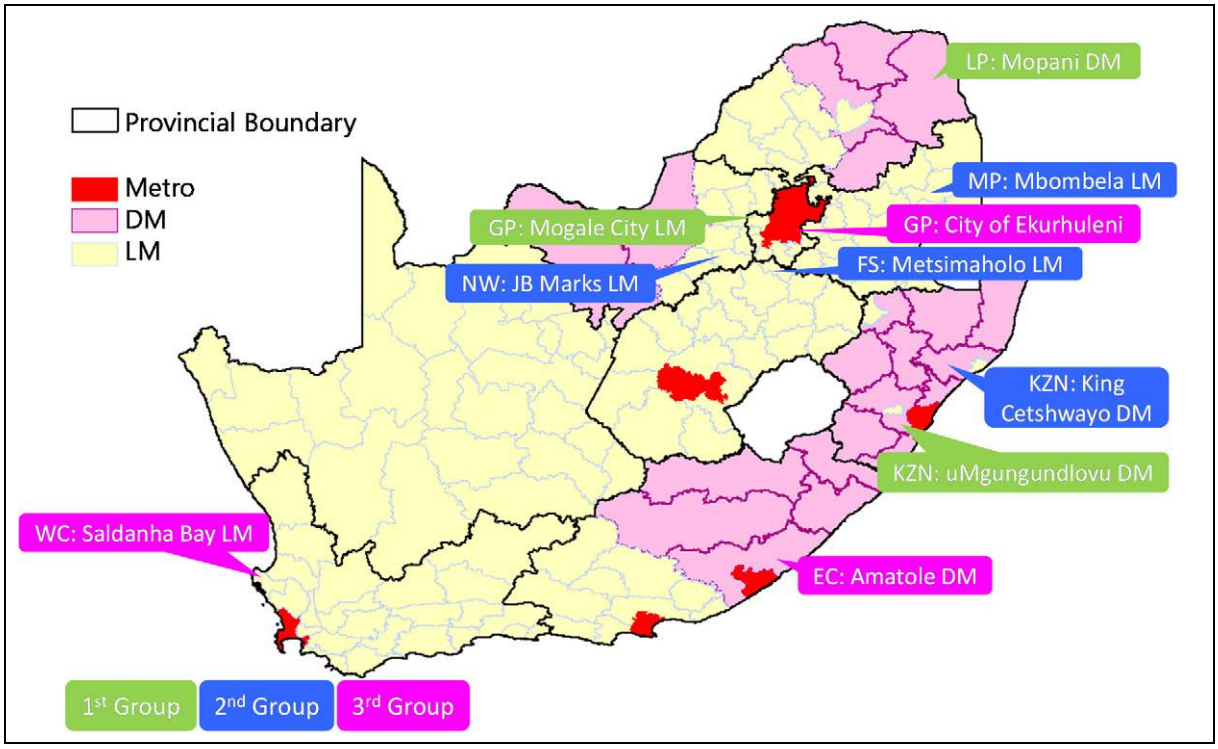


Figure 5-3: Location of Participating Municipalities

Although the Project prepared selection criteria of the pilot DMA and explained to the participating municipalities in mobilization of the 1st and the 2nd group trainings, securing/preparing an appropriate pilot DMA from the training results was regarded as an issue due to the fact that the Project could complete all process of workplace training because the selected pilot DMA didn't meet the criteria in some municipalities.

It is a key for DWS and SALGA to communicate closely with the participating municipalities by exercising own strong leadership, contacting them earlier, fostering understanding of the National NRW Training for their water-related managers (for example by using output presentations prepared by those who participated in the past group trainings) and also ensuring preliminary field visit.

5.3 Activity 3-3: Secure facilitators (experienced/skilled personnel on water reticulation or equivalent) for the National NRW Training from DWS/IBTC and stakeholders.

Through the official protocol of DWS or SALGA, the Project mobilized organizations which candidate facilitators are belonging to, to secure facilitators of the National NRW Training from DWS/IBTC and stakeholders.

Mobilization of facilitators consists of letter issuance from DWS, visit to their organization and explanation to their water-related managers about the Project and the National NRW Training, and following up to confirm their cooperation.

(1) Selection Criteria of Facilitators and Candidate Start-up Facilitators

The Project prepared selection criteria of the facilitators and candidate start-up facilitators in mobilization as below, which were finalized as a part of the National NRW Training Business Plan (refer to Appendix 5).

Selection Criteria of Facilitators

- Experience: More than 10 years experiences of water reticulation design and O&M in a Municipality(ies) (current active and retired)
- Qualification: Engineer, technologist, technician and/or artisan, supervisor, site leader
- Knowledge: IWA water balance, water reticulation, WCWDM, O&M, bulk metering & techniques, etc.
- Core/specialized skills: Good interpersonal skill and communication, ability to teach, facilitate and demonstrate practical skills and application of principles, mentorship, writing skill of reports, etc.

Candidate Start-up Facilitators

- 4 persons: DWS (Construction, WUE and DWS Provincial Office)
- 1 person: Water Board
- 7 persons: Municipalities
- 2 persons: MISA (retired engineer)
- 1 persons: University (e.c. University of Cape Town: UCT)
- Advisors: Water Research Commission (WRC), Tshwane Metro

(2) List of Facilitators

Table 5-4 shows the list of facilitators as a result of mobilization.

Table 5-4: List of Facilitators

No	Organization	Province	Nos.	Mobilization Visit Date
DWS				
1	DWS Headquarters (Construction)	-	1	
2	DWS Kwa-Zulu Natal Office	-	1	
Municipalities				
1	Buffalo City Metro (BCMM)	Eastern Cape	2	No physical visit
2	City of Ekurhuleni (CoEk)	Gauteng	1	19th March 2019
3	City of Johannesburg (CoJ)	Gauteng	2	8th April 2019
4	City of Tshwane (CoT)	Gauteng	2	1st and 10th April 2019
5	City of eThekwini (CoEt)	Kwa-Zulu Natal	2	5th & 8h March 2019
6	Ugu District Municipality	Kwa-Zulu Natal	1	6th March 2019
7	Mbombela Local Municipality	Mpumalanga	1	28h March 2019
8	City of Cape Town (CCT)	Western Cape	6	4th April 2019
9	George Local Municipality	Western Cape	1	5th April 2019
		Total	**20**	

Remarks: IBTC's technical management staff (2) for of training yard and equipment are not included in this list.

Figure 5-4 shows location of organizations (mostly municipalities) to which facilitators are belonging.

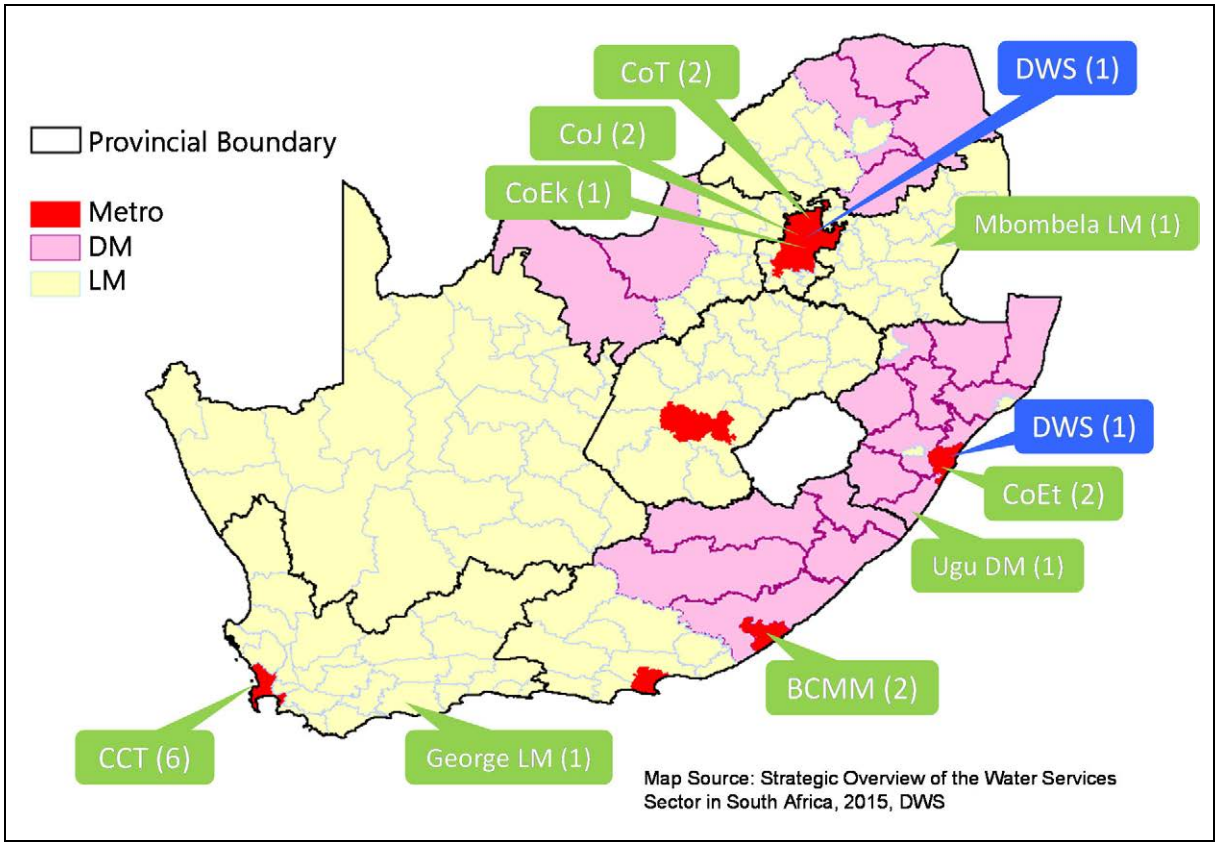


Figure 5-4: Location of Organizations to which Facilitators are belonging

5.4 Activity 3-4: Develop training yard for the National NRW Training at IBTC.

The Project designed and constructed a training yard based on modules of the National NRW Training programme as shown in Table 5-1, water supply services and facilities in municipalities (pipeline, road pavement, backfill, etc.) and municipalities' knowledge and expertise.

The training yard is a practical facility for the purpose of simulating activities and events so that learners can understand the concept of workplace training at the pilot DMA in advance.

The outline of design and construction of the training yard is as follows:

(1) Components of Training Yard

The training yard was constructed in the area of approximately 300m^2 located at the east side of IBTC's main building, and is composed of the following four areas/items:

A. Training area for operation of pressure reducing valve and bulk meter reading
B. Training area for pipe fitting and data logger measurement
C. Training area for water leak detection and water meter reading
D. Training area for water reticulation management (water balance analysis)

The training yard is capable of providing practices shown in Table 5-5. Figure 5-5 shows a layout plan of the training yard, in which module numbers in Table 5-1 are corresponded to ones shown.

The training yard has an incline (5% gradient), so an inlet pipe from the existing pipeline in IBTC was installed in the upper side as well as the training area for water leak detection and water meter reading was designed in the lower side. In the training area for pipe fitting and data logger measurement in which learners deliver and install equipment, the training area was leveled in the flat since slope causes turnover of equipment and falls of learners.

The area functions originally as rainwater drainage in IBTC, therefore, a drain ditch and underground pipes were installed outside from the upper side to the lower side. Retaining wall for preventing stormwater flooding and roof in addition to these measures enable the training to be conducted on rainy days. The Project considered reducing construction cost and ensuring workability by using bricks for the retaining wall outside of the upper side only and carport roof structure for the training yard.

Table 5-5: Components and Concept of Training Yard

A. Training area for operation of pressure reducing valve and bulk meter reading	
Water pressure measurement	➢ Measurement of water pressure using water pressure meter which is equipped with pressure reducing valve
Gate valve operation	➢ Practice of gate valve and other valves opening and closing ➢ Adjustment of water pressure and flow rate using gate valve
Pressure reducing valve operation	➢ Adjustment of water pressure using pressure reducing valve
Pump operation and maintenance	➢ Elementary management of booster pump
Air valve operation	➢ Practice of air valve opening and closing ➢ Confirmation of effectiveness of air valve operation at the transparent acrylic pipe which is installed at item B. Training area for pipe connection and data logger measurement
Measurement of water flow	➢ Measurement of water flow by using mechanical flow meter
● This area is planned to be located at the upper side of the training yard to supply water from existing pipeline to the water tank at this training area. ● Supplied water from existing pipeline is able to be stored in the water tank and/or witched by gate valve to flow into bypass line. ● Water pressure from water tank is pressurized by booster pump up to 0.6MPa in order to conduct practice of water pressure measurement using water pressure reducing valve. ● Moreover, it is able to conduct practice of gate/air valve operation and flow rate measurement using bulk meter and air valve which are installed at the lower side of water reducing valve. ● As the result of leakage volume at training area for pipe connection and data logger measurement, 10m^3 capacity of tank is designed to be able to conduct at least 45 minutes training of leakage detection. However, it is able to conduct leakage detection training continuously without water supply from water tank by using bypass line as direct water supply from existing pipeline. ● Water supply from water tank is able to be circulated thorough pipeline in the training yard with valve operation and return to water tank to reuse. It is considered that capacity of tank is designed to be sufficient volume to stable water current not influence to intake to booster pump. ● As for special remarks of booster pump operation, it is possibility that high water pressure is affected to laid pipes instantaneously at the operation of booster pump, therefore, water distribution by bypass pipe and operation of gate valve are conducted at the operation of booster pump. ● Moreover, loud noise will be happened at the operation of booster pump and water pressure reducing valve, they are covered by brick chamber in order to reduce their noise for leakage detection training.	
B. Training area for pipe fitting and data logger measurement	
Pipe fitting	➢ Straight and bend pipe with flange and socket connection (same pipe materials and different pipe materials) ➢ Galvanized Pipe (GMS) / Polyvinyl Chloride Pipe (PVC) / High Density Polyethylene (HDPE)
Measurement of water flow	➢ Installation of ultrasonic flow meter and measurement of water flow
Leakage repair	➢ Valve operation to stop leakage caused by flanged point ➢ Repair of leakage point by equipment which is suitable for pipe materials ➢ Repair and replacement of water supply equipment using perforated pipe
Valve installation/ removal	➢ Operation, installment, and removal of flange adaptor
● As for practice of pipe laying, PVC pipe, HDPE pipe, and GMS pipe, including flange and socket, are	

targeted for training since they are generally used at the site managed by municipalities.

- Transparent acrylic pipe to be installed is utilized for visualization of movement of air and water flow in order to confirm effectiveness of air valve operation.
- Ultrasonic flow meter is to be installed at exposed pipe for the practice of proper installation and flow measurement.

C. Training area for water leak detection and water meter reading

Detection of laid pipe	➢ Detection of laid GMS and HDPE pipe underground
Leak sound listening	➢ Listening of small leak sound from service pipe and water meter
Leakage detection	➢ Survey and identification of simulated leakage sound of the installed pipe by detection equipment (acoustic bar, leak detector) ➢ Detection of water leakage location by leak noise using correlator ➢ Estimation of leakage volume by visual observation and flow rate from water tap
Minimum Flow Survey	➢ Measurement of flow with consumption and leakage, and flow with leakage only as minimum flow tap opening/closing
Leakage volume surveyed by distribution block system	➢ Leakage volume surveyed by distribution block system (DMA) with gate valve control
Line control by gate valves	➢ Line control by several gate valves at distribution pipeline
Pipe cleaning	➢ Cleaning and draining by fire hydrant and gate valve control
Flow measurement	➢ Flow measurement by mechanical combination meter and flow meters
Opening and closing of hydrant and valve box	➢ Opening and closing of hydrant and valve box by dedicated key

- Leakage detection is to be conducted by acoustic bar and leak detector at experimental leaked points from surface of the road.
- The materials and specification of pipes for leaked points are generally used at the site managed by municipalities.
- Pipes for leaked points consist of several service pipes in order to conduct training of NRW reduction as theft of water and bypass connection.
- In order to identify the leakage area, it is considered that DMA practice with gate valve control is able to be conducted.
- Small cock valve is to be installed at specified distribution pipeline in order to conduct leakage detection from the cock as experimental leaked points.

D. Training area for water reticulation management (water balance analysis)

All items of A and C	➢ Management of distributed water including water balance with comprehensive training of items A and C

- Management of distributed water is to be conducted by the water balance between inflow rate and outflow rate of distribution water with utilization of installed gate valve, tap, flow meter, and distribution pipeline in the training area A and C

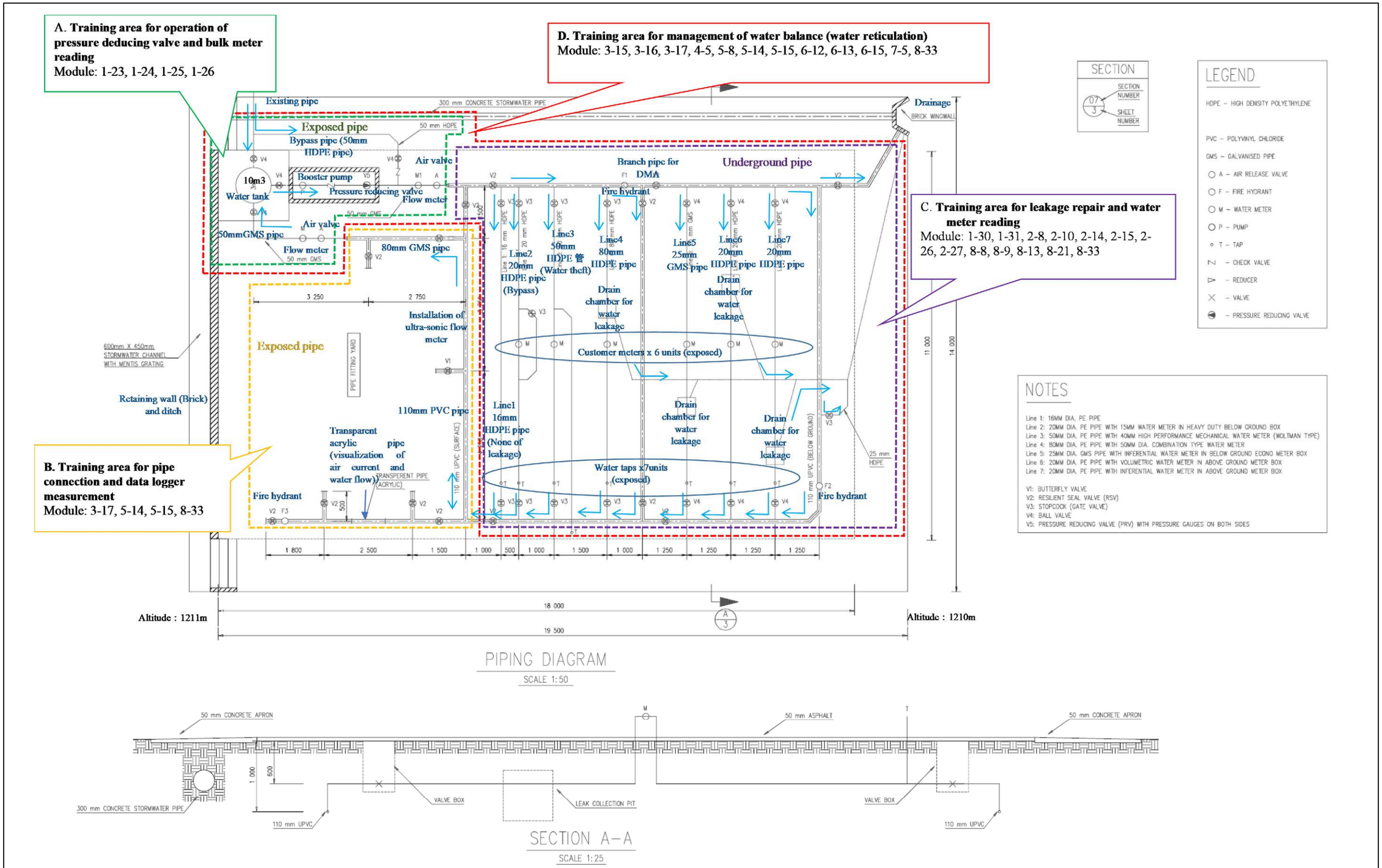


Figure 5-5: Layout Plan of Training Yard

(2) Procurement and Construction Supervision of Training Yard

The Project developed the training yard for the National NRW Training in accordance with the situation on the ground by adopting construction materials and equipment (pipes, flange connection, flow meter and gate valves) which are typically used by municipalities and are able to be procured in South Africa as well as by considering water supply pressure, volume and underground pipe laying.

All mechanical flow meters and customer meters were contributed in kind by City of Tshwane (Utility Services) with the consent of DWS. As for specifications for design and tender, the Project referred to standard specifications of City of Tshwane (Utility Services) of which contents are enriched and open information.

Regarding supervision of the construction of the training yard, the Project thoroughly implements safety, quality and schedule control in accordance with construction management system of South African Bureau of Standards (SABS) and South African National Standards (SANS) on materials.

(3) Construction of Training Yard

Table 5-6 shows main construction items, specifications and quantities.

Table 5-6: Construction Item, Specification and Quantity of Training Yard

Category	Construction Item	Specification and Quantity
Preliminary and General Works	Mobilization, Health & Safety, Temporary Office, Workshop	1 set during construction
Earthworks	Site Clearance	2m height or less: 378.4m^2
	Bulk Excavation and Pipe Trench	Earth cut and embankment: 378.4m^2
		Pipe Trench: 74.26m^3
	Surplus Soil Transportation	IBTC to dumping site: 20.69m^3
	Back-filling	Sand: 90.09m^3
		Soft and hard rock: 36.16m^3
	Asphalt Pavement	Asphalt: :234.58m^2
	Modified AASHTO Density Test	Aashto:15 times
Concrete Works	Casting	Class 25Mp/19mm: 8.6m^3
	Strength Test Cube	Volume 15cm x 15cm x 15cm: 18 times
	Formwork	Wooden plate: 102.69 m^2
	Base	Concrete: 14.23m^2
		Lean Concrete (less than 300mm width: 134.75m
	Precast Concrete (Drainage)	Mentis type granting (Ditch 600mm x 450mm): 14 pcs
Piping Works	HDPE Pipes	Dia. 16mm - 80mm: 74.75m
	Steel Pipes	Dia. 25mm - 80mm: 33.0m
	PVC Pipes	Dia. 110mm: 77.0m
	Fittings, Flanges, and	HDPE pipes, Steel pipes, PVC pipes, Deformed

Category	Construction Item	Specification and Quantity
	Accessories	pipes : 1 set
	Service Pipes	Dia. 16mm - 80mm: 7 connections
	Water Flowmeters and Vales	Dia. 15mm - 110mm: 1 set
	Water Storage Tank	Installation of water storage tank, inlet and outlet pipes: 1 set
Brick Works	Chamber	Chamber surface area: 18.37m^2
	Brick Wall	Wall surface area: 11.0m^2
	Reinforcement	75mm width bricks: 102.5m
		150mm width bricks: 77.0m
Appurtenant	Joint Sealants	10mm x 20mm polystyrene: 68.48m
	Roof Cover	20m x 13m x 3.5m galvanized-steel: 1 set
	Chamber Cover	2m x 1m steel: 1 set
	Mortar Plaster	Class II mortar: 12.72m^2
	Electrical	Installation of switch box: 1 set

(4) Procurement Process of Training Yard

The training yard was constructed and handed over as shown in Table 5-7.

Table 5-7: Procurement Process of Training Yard

Date	Description
4th February 2019	Distribution of tender documents to 4 nominated contractors
6th February 2019	2 contractors visited construction site at IBTC.
12th February 2019	The 1st answers to contractor questions
14th February 2019	The 1 contractor visited construction site at IBTC.
21st February 2019	The 2nd answers to contractor questions
28th February 2019	- Tender opening with attendance of DWS and JICA South Africa Office - Negotiation with the lowest bidder out of 2 bidders.
12th March 2019	- Contract agreement with the lowest bidder - Commencement of construction
25th June 2019	The 1st amendment of contract agreement to extend contract period to improve piping work and pavement
17th October 2019	- The 2nd amendment of contract agreement to finalize contract price based on the final evaluation of BoQ - Completion and hand over
30th June 2020	Defect warranty expiration

(5) Documents and Maintenance Manual

All construction and supervision documents are kept in IBTC. Maintenance manual of the training yard was finalized as a part of the SOP (Refer to Appendix 6).

5.5 Activity 3-5: Procure equipment, instruments/tools and materials for the National NRW Training.

Based on modules of the National NRW Training programme as shown in Table 5-1, the Project procured equipment, instruments/tools and materials in consideration of the market and distribution of South Africa.

In selection of the equipment, instruments/tools and materials, the Project consulted information obtained from the baseline survey, discussions with DWS/WUE, interview with consultants/suppliers about water leak detection and flow measuring in South Africa.

The Project confirmed they are available and imported from various international manufacturers by South African consultants and/or suppliers, then concluded to procure all of them in South Africa in terms of repair services and spare parts.

(1) Training Equipment

The Project procured training equipment for particularly practices in the yard, for example, flow & pressure logger (Modules 5-14 and 15 in Table 5-1. Training area for water reticulation management), and listening stick, ground microphone and correlator (Modules 8-9 and 8-10 in Table 5-1. C. Training area for leakage detection and water meter reading).

Table 5-8 shows training equipment and correspondence to the modules described in Table 5-1

Table 5-8: Training Equipment and Corresponding Modules

No	Item	Image	Purpose	Units	Module	Reasons for the Units (Numbers)
1	Ultrasonic Flow meter		To measure input volume	2	1-24, 25, 5-14, 15.	To measure input and output at the work place. To measure 2 points at the same time to compare the flow data.
2	Pressure logger		To measure water pressure and record flow volume	3	1-24, 25, 5-14, 15.	To be able to log pulse signal from Bulk meter To be able to compare points of inlet, end point, and some trouble point (leak, block)
3	Leak noise correlator		To measure distance to leakage from sensors	1	8-9,10	To use in the training yard and workplaces
4	Ground Microphone		To detect loudest noise point of surface	3	8-9,10	To use in the training yard (2 units) and workplaces (plus 1 unit)
5	PVC Locator		To locate PVC or ACP pipe line	1	8-9,10	To locate the trial for PVC detection
6	Metal Pipe Locator		To locate Metallic Pipe or Electric Cables	1	8-9,10	To use in workplaces
7	Buried Valve Locator		To detect buried water valve	1	8-9,10	To use in workplaces
8	Electric Listening Stick		To listen to leak sound at pipe fittings	1	8-9,10	To use in workplaces
9	Listening Stick		To listen to leak sound at pipe fittings (Analogue)	5	8-9,10	To use in the training (3 units) and workplaces (plus 2 units)
10	Walking Measure		To measure distance of ground surface	1	8-9,10	To measure distance when using Correlator
11	Hammer Drill		To make a 19mm hole to asphalt to insert listening stick to confirm underground leakage	1	8-9,10	To use in workplaces
12	Boring Bar		To bore a hole (12-15mm) to insert listening stick to confirm underground leakage	2	8-9,10	To use in workplaces
13	Reference meter		To check accuracy of mechanical water meter	1	1-24	To use in the training yard.

(2) Procured Training Equipment

Table 5-9 shows equipment items and quantities which the Project procured.

Table 5-9: Procured Training Equipment and Quantity

No	Equipment Item	Manufacturer and Model	Quantity
1	Ultrasonic Flow-meter	Primayer, Primeflow T (RXG845) with Thickness Gauge SA40	2
2-1	Data Logger	Primayer, Primelog 2i +XAP Display	2
2-2	Data Logger	Technolog, Cello 4S	1
3	Leak Noise Correlator	Gutermann, AquaScan 610	1
4-1	Ground Microphone	Gutermann, AquaScope 3-C	1
4-2	Ground Microphone	SebaKMT, HL5000 Pro	1
4-3	Ground Microphone	Fujitecom, DNR-18	1
5	PVC Locator	Fujitecom, NPL-100	1
6	Metal Pipe Locator	Gutermann, AquaTracer 200	1
7	Buried Valve Locator	Gutermann, Magscan 100	1
8	Electric Listening Stick	Gutermann, AquaScope 2	1
9	Listening Stick	Fujitecom, LSP-1.5m	5
10	Walking Measure	GRIP, GT9050	1
11	Hammer Drill with Bits	Ryobi, RH1440, 3 x Dia19 x 500mm SDS-Max Bits	1
12	Boring Bar	Fujitecom, Boring bar 1.0m	2
13	Reference Meter	Sensus, iPERL 25mm	1

(3) Procurement Process of Training Equipment

The training equipment were procured and delivered as shown in Table 5-10.

Table 5-10: Procurement Process of Training Equipment

Date	Description
5th March 2019	Quotation request to nominated suppliers
25th March 2019	Receipt of quotations (Supplier A, B and C), opening with DWS, specification check and comparison
23rd April 2019	Contract agreement for a large portion of equipment items with Supplier A quoted the lowest price in total
26th April 2019	Contract agreement for a small portion of equipment items with Supplier B
5th June 2019	Amendment of contract agreement with Supplier A due to delay in import and customs clearance
7th June 2019	Contract agreement for a small portion of equipment items with Supplier C
26th June 2019	Delivery by Supplier B and inspection
27th June 2019	Delivery by Supplier C and inspection
1st July 2019	Delivery by Supplier A and inspection (10th July 2019)

(4) Documents and Maintenance Manual

All procurement documents and instructions are kept in IBTC. Maintenance manual of the training equipment was finalized as a part of the SOP (Refer to Appendix 6).

5.6 Activity 3-6: Develop teaching/learning materials for the NRW Training with incorporating good practices from baseline survey into the materials if any.

Based on modules of the National NRW Training programme as shown in Table 5-1, the Project developed teaching/learning materials of the training through discussions and confirmation in facilitator technical meetings as described in Chapter 5.7. Moreover, the Project revised them by using knowledge and lessons learnt from the conducted trainings and also for online system adaptation.

(1) Programme Outline

The Project prepared the programme outline (schedule) for each training with consideration for weekends and public holidays, and modified its scheduling due to shortening of the training duration and online introduction (refer to Appendix 9).

(2) Presentations

The Project prepared the presentations based on modules of the National NRW Training programme as shown in Table 5-1, and revised them in accordance with modification of scheduling as above (refer to Appendix 9).

(3) Textbook

The Project prepared the textbook based on modules of the National NRW Training programme as shown in Table 5-1, and revised as needed (refer to Appendix 9).

(4) Facilitation Guidelines

The Project prepared facilitation guideline to conduct the National NRW Training (refer to Appendix 9).

5.7 Activity 3-7: Prepare and conduct Facilitator Technical Meetings by both facilitators and JICA Experts for the National NRW Training.

The Project conducted facilitator technical meetings (workshops) four times during the project period.

(1) Purpose of Facilitator Technical Meetings

Purposes of facilitator technical meetings are:

a. To facilitate team building
b. To build consensus of the National NRW Training
c. To confirm appropriateness of annual programme and model schedule
d. To let facilitators take part in training development by inputs based on their knowledge and experience
e. To confirm availability and engagement of facilitators and ensure implementing structure
f. To make network among municipal officials at working-level
g. To improve knowledge and skills of facilitators

(2) Facilitator Technical Meetings

Facilitator technical meetings were conducted four times with facilitators from municipalities and DWS as shown in Table 5-11.

Table 5-11: Facilitator Technical Meetings

Facilitator Meeting	Date	Participants	Remarks
1st Meeting (IBTC)	3rd-5th July 2019	28	Rescheduled from 4th-6th June
2nd Meeting (IBTC)	19th&20th September 2019	24	Rescheduled from 29th&30th August
3rd Meeting (Online)	20th&21st October 2020	31	
4th Meeting (Online)	12th November 2020	14	Rescheduled from 10th&11th Nov.

(3) Contents of Facilitator Technical Meetings

Table 5-12 shows contents of facilitator technical meetings (refer to Appendix 10 for details).

Table 5-12: Facilitator Technical Meetings

The 1st Facilitator Technical Meeting
➢ Project summary ➢ Concept and outline of the National NRW Training (modules/contents, workplace training model/process/methodology) ➢ Tour of IBTC facilities, training yard and equipment ➢ Draft annual training programme, schedule model, implementing structure, participating municipalities ➢ Draft teaching/learning materials of the National NRW Training ➢ Strength and interests of Facilitators by module ➢ Deployment of Facilitators in knowledge, practice and workplace ➢ Role-sharing arrangement in annual programme (provisional) ➢ Pre-confirmation of facilitators' engagement ➢ Schedule of the 2nd Facilitator Meeting and delegation's debriefing ➢ Detail schedule of the 1st and 2nd National NRW Training ➢ Pre-confirmation of role-sharing arrangement of Facilitators of the 1st and 2nd National NRW Training ➢ Explanation of the 2nd Training in Japan
The 2nd Facilitator Technical Meeting
➢ Debriefing by delegation to Japan and Q&A ➢ Confirmation of the National NRW Training (modules/contents, teaching/learning materials) ➢ Dry-run/rehearsal/demonstration of the National NRW Training ➢ Detail schedule of the 1st and 2nd National NRW Training ➢ Confirmation of role-sharing arrangement of Facilitators of the 1st and 2nd National NRW Training
The 3rd Facilitator Technical Meeting
➢ Draft programme of the online training for knowledge ➢ Modules (presentation slides) ➢ Facilitator allocation
The 4th Facilitator Technical Meeting
➢ Confirmation of programme of the online training for knowledge (dates, timeframe and participating municipalities ➢ Confirmation of facilitator allocation ➢ Confirmation of modules (presentation slides) ➢ Confirmation of IT environment

5.8 Activity 3-8: Prepare for conducting the National NRW Training.

As a preparation for the National NRW Training, the Project mobilized the participating municipalities for each group respectively to nominate learners as described in Chapter 5.2.

To conduct the training at IBTC, DWS/IBTC arranged accommodation, transport and catering for facilitators and learners as well as prepared class rooms and DWS/IBTC's guest house.

On the other hand, the participating municipalities, which hosted the training in workplaces, were responsible for receiving the training such as learners' participation, logistics and necessary spaces, while DWS/IBTC arranged accommodation and transportation for facilitators.

To prepare the 3rd group training online for knowledge and part of practices, DWS/IBTC communicated with learners by emailing or phone to confirm their attendance and extended the invitation and information of the links of the online meeting platform.

5.9 Activity 3-9: Conduct the National NRW Training by facilitators with support from JICA Experts.

The Project conducted the training fully (knowledge, practice and workplace) for the 1st and the 2nd groups, and the online training (only knowledge component and a part of practice) for the 3rd group under the COVID-19 circumstances.

(1) Schedule of the National NRW Training

The Project conducted the trainings as shown in Table 5-13.

Table 5-13: Schedule of the National NRW Training within Project Period

Training	Schedule	Details
The 1st Group	7th October - 29th November 2019	Stage 1(IBTC) : 7th - 11th October 2019 Stage 2(Workplace) : 21st October - 1st November 2019 Stage 3(IBTC) : 4th - 8th November 2019 Stage 4(Workplace) : 18th - 29th November 2019
The 2nd Group	27th January - 6th March 2020	Stage 1(IBTC) : 27th - 31st January 2020 Stage 2(Workplace) : 10th - 14th February 2020 Stage 3(Workplace) : 24th - 28th February 2020 Stage 4(IBTC) : 5th - 6th March 2020
The 3rd Group (Postponed)	11th May - 19th June 2020 (Postponed because of COVID-19 pandemic)	Stage 1(IBTC) : 11th - 15th May 2020 Stage 2(Workplace) : 25th - 29th May 2020 Stage 3(Workplace) : 8th - 12th June 2020 Stage 4(IBTC) : 18th - 19th June 2020
The 3rd Group (Online)	17th November 2020 - Not completed (Only knowledge component and a part of practice were conducted.)	Stage 1(Online) : 17th - 20th November 2020 Stage 2(Workplace) : within FY2021/22 (plan) Stage 2(Workplace) : within FY2021/22 (plan) Stage 4(IBTC-TBD) : within FY2021/22 (plan)

(2) Learners in the National NRW Training

The following learners participated in the National NRW Training as shown in Table 5-14.

Table 5-14: Learners in the National NRW Training

No	Municipality Name	Learners	Workplace & Remarks
1st Group Training			
1	Mogale City Local Municipality	6	Azaadville
2	Mopani District Municipality	4	Phalaborwa Town
3	uMgungundlovu District Municipality	5	Cedara Township
-	DWS's WCWDM regional champion	8	-
	Sub-total	**23**	
2nd Group Training			
1	Metsimaholo Local Municipality	3	Sasolburg
2	Mbombela Local Municipality	5	Hazyview, including 2 partial attendance
3	JB Marks Local Municipality	3	Potchefstroom
4	King Cetshwayo District Municipality	6	Kwambonambi, including 2 partial attendance
-	DWS's WUE and KZN regional staff	3	-
	Sub-total	**20**	
3Rd Group Training (online)			
1	Amathole District Municipality	3	Workplace component not yet done
2	Saldanha Local Municipality	3	Workplace component not yet done
3	City of Ekurhuleni (Metro)	5	Workplace component not yet done
4	DWS's WUE and KZN regional staff	1	-
	Sub-total	**12**	

Remarks: George Local Municipality declined due to municipality's matter in the 1st group training.
Sol Plaatje Local Municipality declined due to municipality's matter in the 1st group training.

(3) Facilitators and DWS Coordinators in the National NRW Training

The following facilitators, IBTC coordinators (including logistics and administrative staff) participated in the National NRW Training.

Table 5-15: Facilitators and IBTC Coordinators in the National NRW Training

	Period	Facilitators	IBTC Admin & Coordinator
1st Group Training			
IBTC	7th - 11th October 2019	7 (CCT:3, CoT:1, CoEk:1, CoEt:1, DWS:1)	3
Workplace	21st Oct. - 1st Nov. 2019	4 (CCT:3, DWS:1)	4
IBTC	4th - 8th November 2019	2 (CCT:1, DWS:1)	4
Workplace	18th - 29th November 2019	4 (CCT:4)	3
	Sub-Total	**17**	**14**
Observation - The 1st group training was conducted in short supply of facilitators and DWS coordinator available continuously to engage themselves particularly in workplaces. - Not all of facilitators from municipalities participated in the 1st group training.			
2nd Group Training			
IBTC	27th - 31st January 2020	5 (CCT:2, CoT:1, Mbombela:1, DWS:1)	6
Workplace	10th - 14th February 2020	4 (CCT:3, Mbombela:1)	5
Workplace	24th - 28th February 2020	2 (CCT:1, Mbombela:1)	4
IBTC	5th - 6th March 2020	3 (Mbombela:1, CoJ:1, CoEk:1)	4
	Sub-Total	**14**	**19**
Observation - By enhancing coordination, the 2nd group training was conducted better but still in short supply of facilitators available continuously to engage themselves particularly in workplaces. - Not all of facilitators from municipalities participated in the 2nd group training.			
3rd Group Training (online)			
Online	17th - 20th November 2020	7 (DWS:1, CCT:3, CoT:1, BCM:1, Mbombela:1)	4
Workplace	Within FY2021/22	-	-
Workplace	Within FY2021/22	-	-
IBTC (TBD)	Within FY2021/22	-	-
	Sub-Total	**7**	**4**
Observation - The internet connection of a facilitator participating from a municipality became unstable, then a substitute facilitator assumed a role in the online training.			

5.10 Activity 3-10: Monitor the National NRW Training and feed the results back under training improvement cycle.

The Project monitored the National NRW Training through by self-evaluation and participants/learners' evaluation (questionnaire) to improve the training. Although the Project had operational issues such as ensuring facilitator's active/continuous participation, the training was very well evaluated (refer to Appendix

11).

Evaluation category is as below:

Evaluation Category

a. Programme Outputs and General (Achievement of programme's aims, Programme length, Number of learners, Interactive communication)
b. IBTC Facilities
c. Programme Contents and Design
d. Facilitators and Facilitation
e. Coordination

Figure 5-6 shows results of evaluation scoring by learners in the 1st and 2nd group trainings.

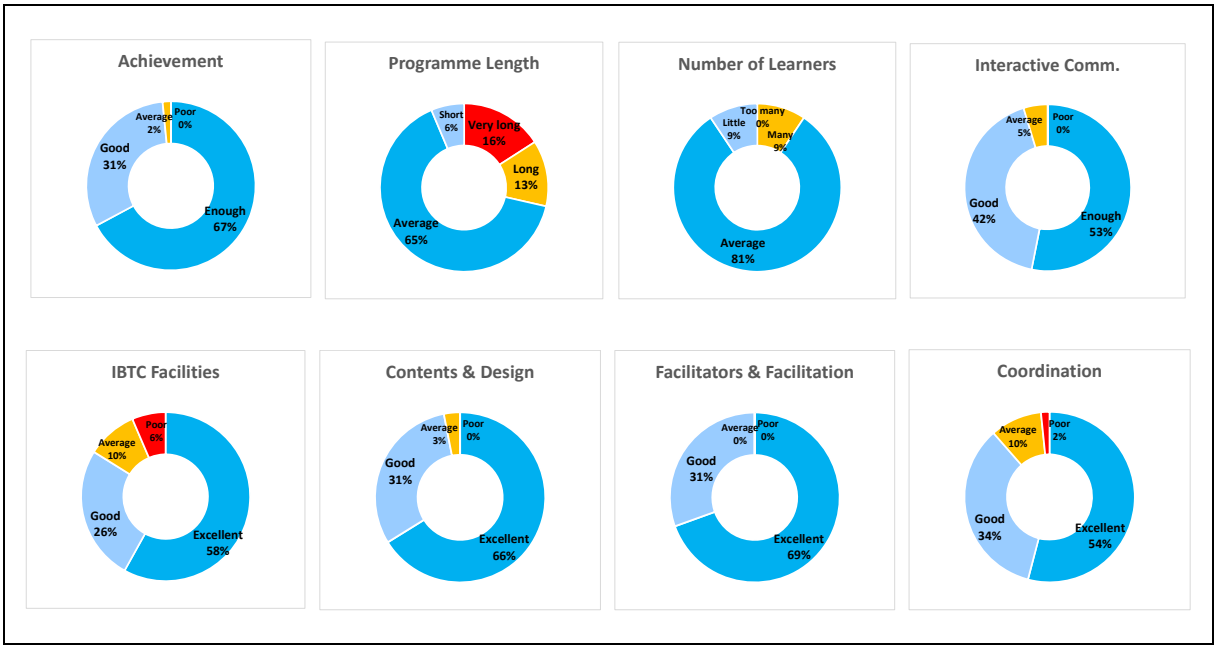


Figure 5-6: Summary of Evaluation Results by Participants

Comments (qualitative evaluation) by learners in the 1st and the 2nd group trainings are as below:

Comments by Learners

- **Programme Outputs and General**
  - The programme was productive and we have learn a lot of things that we will teach our colleagues in workplace.
  - Some participants are on admin section and other on technical section. As I'm in a technical section, I have not been exposed to administrative section, but since the beginning of the training I gained from the admin section.
  - DWS must make sure that senior managers in municipalities comply with the programme.
  - The outcome of the training will improve the billing system in my municipality.
  - The action plans as an output will help both improving pilot DMA studies and training implementation.
- **IBTC Facilities**
  - Very clean, well ventilated and comfortable in IBTC, but accommodation was very poor.
  - Venue and seating comfort was good in IBTC.
  - Air-conditioning sometimes did not function in IBTC
- **Contents and Programme Design**

- Training reached my expectation.
- It was one of the top programme design for me.
- Though the programme was driven for the first time but it shows a very good successful potential.
- This is one of the best training for me by DWS, and this can help dealing with War on Leak programme and improving WCWDM.
- The content can be improved based of findings during the workplace training.
- All the instruments and textbooks were well organized and also all the exercise were good and well understandable.
- This programme should be extended and phased to accommodate all the features to different municipalities.

➢ **Facilitators and Facilitation**

- Facilitation was well prepared but I think workplace training is the most important. The theoretical component's time allocation is too much, 3 days is better.
- Facilitators were well prepared, organized and mannered, they've god what it takes for them to drive the programme concept. They had a big impact to our municipalities to reduce NRW.
- The facilitators are informative, gave us their knowledge and functioned.
- Kindly improve the presentation of DWS grant for more information.
- Presentations by all various municipalities were so excellent.

➢ **Coordination**

- Communication was not well as we get information late. I think it need to be improved.
- Coordination with our municipality was not good. Because we left some information behind because we were not told.
- Information should be given to us in advance to prepare properly before it comes from our principals.
- The organizer should have emphasized the point of finance billing section which was supposed to be part of the training course.

➢ **Others**

- I would like the organizers to make provision to make different municipalities to visit other municipalities to experience the way they operate. This will also help officials to gain or to experience different atmosphere and learn new things and implement to their own municipality.
- The IBTC yard can be used to make a good example of a DMA. Can also provide a platform to perform the most work that can be done in municipal environment.
- I suggest that this programme doesn't be a once off session. It can be instilled to our municipal directors to be a continuous practice so as to improve the municipality financially.
- I feel that the course should include the management as most of the activities need them, so that they can be implemented at our municipalities.
- The programme is very educational and will surely assist our municipalities in achieving more revenue, and also improve our working relationship between departments especially finance and technical.
- I feel strongly to bring all the stakeholders to be part of the training in order to give us the knowledge and experience in their workplace (problem). This exercise will assist us to determine the problems.
- I wish next time there must be always follow up to the municipalities. The training organizer must e-mail all the things that are needed during the training such as maps and others.
- The programme is on the right path, but needs more buy-in of facilitator's employers to enable better assistance during workplace training period.
- Confirmation of flight and accommodation booking must be done at least 3 days before the training date.

The Project summarizes learners' evaluation as below, but should make use of them for steady and further improvement.

➢ Customer (participant) satisfaction is high particularly by the fact that "Achievement of Training Aims", "Programme Contents and Design", and "Facilitators and Facilitation" were rated high.

- Evaluation results about "Programme Length (long or short)" seem to differ by participants' organization and routine works, the Project should continue to consider it. (As mentioned above, the Project shortened the training length from 6 weeks to 3.5 weeks after the 1st group training.)
- The evaluation results at high rate about "Interactive Communication" among participants means the Training helped sharing of their challenges, lessons, good practices, and enhanced their common understanding at the working level officials.
- "IBTC Facilities" was partially rated at poor. This was caused by low quality of both DWS's guest house next to IBTC and catering outsourced in the 1st group training that was improved, as well as by an air-conditioning problem of auditorium in the 2nd group training.
- "Coordination" should be improved in preparation and implementation of the Training at both IBTC and workplaces were observed.
- From the standpoint of both the operational side (DWS, facilitator) and the participating side (workplace, learners), senior managers' understanding and support for the National NRW Training and NRW management is the key to the success of the Training.

The evaluation results of the 3rd group training are not included in the above scoring because it is only for the online training, but was marked high as with the 1st and the 2nd group trainings (refer to Appendix 11).

5.11 Activity 3-11: Verify effects of the National NRW Training in sampled municipalities.

As an immediate effect of the National NRW Training programme, all participating municipalities conduct/experience baseline survey, problem clarification including simplified water balance, planning and ideally measures to reduce NRW in workplace (pilot DMAs), and prepare suggestions and action plans for way forward of participating municipalities at the end of each group training.

Refer to Appendix 12 for their output presentations in the 1st and the 2nd group trainings.

It is advised that DWS and SALGA should continue to support participating municipalities in realization, financing, decision maker (management) buy-in of suggestions and action plans as well as to monitor impacts on participating municipalities after the training.

5.12 Activity 3-12: Assess the feasibility and sustainability of online system adaptation into the National NRW Training.

The Project assessed the feasibility and sustainability of online system for the National NRW Training through regular meetings, facilitator technical meetings and the 3rd group training by means of online meeting platform as well as other online events (refer to Table 5-16).

While there are several issues and risks as shown in Table 5-16, the National NRW Training can adapt to online system.

Table 5-16: Feasibility Assessment of Online System for the National NRW Training

Item	Operational (IBTC)	Operational (Facilitator)	Participating Municipalities (Learners)	Remarks
Internet environment	☑ (Not stable)	☑	☑	IT improvement of IBTC is an issue. All participants have the possibility of internet instability.
PC, Tablet terminal, etc.	☑	☑	☑ (Some don't own.)	Subject to learner.
Online meeting platform (Technical, operation)	☑	☑	☑	Some learners are unfamiliar with it.
Communication cost	☑	☑	☑	Participating municipalities or learners bear the cost.
Security restriction	☑	☑	☑	No restriction of using Microsoft Teams

5.13 Activity 3-13: Review, revise or upgrade the programme/curriculum, and develop new form and ways of the National NRW Training with online system adaptation.

To ensure the concepts of the National NRW Training in principle even if online system is introduced, the Project decided not to change modules of the training programme. As described in Chapter 5.1 (3), the stage 1 for knowledge component (and a part of practice component) in the 3rd group training was conducted online of which the duration was shortened, with maintaining the conceptual programme flow the National NRW Training shown in Figure 5-1(refer to Appendix 9).

The Project concluded the National NRW Training for practice component requiring training yard and equipment as well as workplace component cannot be conducted online.

5.14 Activity 3-14: Review, revise or upgrade learning/teaching materials and tools for online system adaptation.

As described in 5.6, the Project reviewed and customized (rather than revised/upgraded) the presentations as part of learning/teaching materials for online system adaptation in line with revision of training programme schedule by shortening the duration of the Stage 1 for knowledge component (and a part of practice component) in the 3rd group training (refer to Appendix 9).

5.15 Activity 3-15: Procure additional services, equipment, instruments/tools and materials for online system adaptation.

As described in Chapter 4.8, in regard to online system adaptation, the Project used the DWS's existing standard platform "Microsoft Teams" without procuring online meeting platform for the training. IBTC has

discussed with the DWS's Directorate: IT for procuring the account dedicated to IBTC.

Although cloud storage dedicated to IBTC was suggested as a data/file sharing tool internally and externally, it didn't reach a decision to bring in the cloud storage due to the DWS's security. However, through experiences and lessons learnt in a series of project activities, IBTC has understood those necessity and usefulness, and has discussed with the relevant Directorates (Chief Information Officer) for enhancing ICT.

Likewise, IBTC has discussed with the relevant Directorates for enhancing internet and procuring the account dedicated to IBTC.

5.16 Wrap-up of the National NRW Training Implementation

Although all three group trainings were conducted according to the scheduled process, the conditions (data availability, facility status, etc.) of workplace training and capacity differed depending on the participating municipalities, and consequently the Project couldn't complete workplace training according to the conceptual flow of the training programme (refer to Figure 5-1). Therefore, when conducting workplace training hereafter, it is essential for DWS/IBTC to give careful advice to the participating municipalities regarding the training purpose, contents, preparation of information and data in advance.

However, it is of great significance that various problems are revealed which the participating municipalities should solve before taking measures against NRW. In other words, the National NRW Training is valuable as a training that provides an opportunity to face things as they are and outputs in workplace.

The National NRW Training relies on facilitator's active/sustainable participation in the training at both IBTC and workplaces. Although DWS coordinated among facilitators to allocate them for the training implementation, some facilitators could not be part of the Training as planned. In that case, the Project managed it with other facilitators available with support from the JICA Experts.

As a key to sustainability of the National NRW Training, DWS/IBTC should ensure early communication, steady coordination and logistics arrangement, and strong initiatives with support from SALGA. Furthermore, enhancing talent pool of facilitators and workplace mentors from stakeholders including the learners who were certified in the past training is also important.

It was confirmed that the procured training yard and equipment have conformed to the training programme and modules' purpose effectively, and have been utilized in practices at IBTC and/or workplace training. However, their utilization in the 3rd group training (online only) was limited, and flexible application that meets the implementation conditions is required when resuming practices and workplace training in the future.

Chapter 6 Inputs

6.1 Inputs from the South African Side

(1) Project Personnel

Project members including a JCC Chairperson, Project Directors, Project Managers, a Project Management Committee (PMC) Chairperson, PMC Leaders, a Coordinator, members and associates have participated throughout the project period, as listed in Table 1-1, Table 2-1 and Figure 2-2.

(2) Land, Building and Facilities

Office spaces and necessary facilities at IBTC, Directorate Water Use Efficiency of DWS head office and SALGA were furnished to JICA Experts. A site for the training yard was also secured in IBTC. Wi-Fi and network was not available due to DWS's security restriction, but this did not affect the project operation since JICA Experts managed to procure separately.

(3) Local Cost

All administrative and logistics costs such as communication, accommodation, travelling/transport and catering for South African members and officials in mobilization, facilitator meetings and the National NRW Training implementation at IBTC and workplaces were borne.

However, DWS's financial problems caused a difficulty in smooth budget execution in FY2018/19 for project activities such as facilitator mobilization because DWS came under the administration of the National Treasury provisionally. In response to this, priority was given to activities not affected by budget execution in FY2018/19, the activities affected were extended to the following FY2019/20 by the PO revision, and delayed inputs were implemented.

(4) Others (Handover Ceremony)

Handover ceremony was held at IBTC on 22nd March 2021 that was attended by the Minister of Human Settlements, Water and Sanitation, the Ambassador of Japan to South Africa, the Minister of CoGTA, the President of SALGA, the JICA Chief Representative and a Member of the Mayoral Committee of the City of Tshwane (MMC: Utilities Services and Regional Operations and Coordination). The ceremony was livestreamed by web meeting platform and online video platform, and reported by South African newspapers and a news broadcast (refer to Appendix 13).

Costs of ceremony preparation, venue setup, catering, construction of a podium for project plaque and so on were borne.

6.2 Inputs from the Japanese Side

(1) JICA Experts

The JICA Experts consisting of a Chief Advisor and members for eight areas of expertise were assigned to the Project in South Africa to assist South African project members to implement activities and also in Japan for supervising trainings in Japan and remote assistance under the COVID-19 circumstances, throughout the project period as shown Table 6-1.

Table 6-1: Assignment of JICA Experts

Position in the Project	Name	Company	Person-Month	
			Phase 1	Phase 2[*1]
Chief Advisor / NRW Management	Akinori MIYOSHI	YEC	7.27	15.73
Deputy Chief Advisor / NRW Management	Taketoshi FUJIYAMA	YEC	2.87	0.15
Skills Programme Planning/ Organization Coordination	Ken-ichiro SUGIYA	YEC	7.53	6.27
Water Leakage Detection	Hiroki NIIMURA	YEC	3.27	10.20
Water Distribution Control / Commercial Loss	Hiroyuki MORITA	YWC	2.97	8.30
Water Distribution Control / Commercial Loss 2	Ken YOKOYAMA	YWC	-	0.90
Training Yard Design and Supervision	Masuji IDE	YWC	4.70	3.00
Procurement / Administrative Coordination	Toshinobu KASUYA	YEC	4.00	1.50
Procurement / Administrative Coordination	Risa KOSHIYAMA	YEC	-	2.50
Training-in-Japan Preparation and Supervision	Masuji IDE	YWC	1.00	1.00
Training Management / Human Resource Development	Nobutaka MARUYAMA	JICA	(Long-term)	(Long-term)
Total			**33.61**	**49.55**

Remarks: *1 Remote assistance by JICA Experts from Japan under the COVID-19 circumstances is included
YEC: Yachiyo Engineering Co., Ltd. YWC: Yokohama Water Co., Ltd.

(2) Facilities (Training Yard)

The training yard for the National NRW Training at IBTC, which was constructed (outsourcing to a South African contractor selected by tender process) and handed over to DWS in October 2019, was utilized for a practical component in the 1st and the 2nd group/intake trainings. Refer to Chapter 5.4 for details.

The yard was supposed to be constructed in the Phase 1, but actually it was done in the Phase 2 because of a delay in the baseline survey and development of the National NRW Training programme.

(3) Facilities (Website and Cloud Storage)

The Project planned initially to develop an independent website for the purpose of publicizing and promoting the National NRW Training as an input from the Japanese side, but it concluded that DWS makes use of the own existing website as a platform in principle. DWS has created a tab menu for IBTC, but it has been difficult to browse the DWS website due to maintenance since February 2020 and improvement in contents, graphic design and access guidance has been an issue.

Regarding online system adaptation, the Project used the DWS's existing standard platform "Microsoft Teams" without procuring an online meeting platform for the training. Although cloud storage dedicated to IBTC was suggested as a data/file sharing tool internally and externally, it did not happen due to the DWS's security policy.

At the same time, the JICA Exerts proposed the draft contents of website for commercializing the National NRW Training and utilization of cloud storage as described in Chapter 4.8. Furthermore, through actual experiences and lessons learnt in a series of activities, IBTC has understood the necessity and usefulness, and has kept discussions with the relevant Directorates (Chief Information Officer) for enhancing public relations and ICT.

Besides the above website, the Project developed a website dedicated to the SALGA-JWWA Joint Seminar for Water Supply Sector for public relations and knowledge sharing including the National NRW Training (refer to Chapter 3.5 for details).

(4) Equipment, Instruments, Tools and Materials

The training equipment for the National NRW Training at IBTC and workplaces, which were procured from South African suppliers selected by competition of estimates and handed over to DWS in October 2019, were utilized for practical and workplace components in the 1st and the 2nd group/intake trainings (refer to Chapter 5.5 for details).

The equipment were supposed to be procured in the Phase 1, but actually it was done in the Phase 2 because of delay in the baseline survey and development of the National NRW Training programme.

(5) Training in Japan (including Joint Seminars)

The 1st training in Japan for nine South African officials (management) and the 2nd training in Japan for 17 officials (facilitators and project members) were conducted in April 2018 and July-August 2019 respectively during the project period. In addition, JICA as a co-host sponsored the SALGA-JWWA Joint Seminars for Water Supply Sector (refer to Chapter 3.4 for details).

Although outside the scope of the Project, a project member from DWS and a facilitator from City of Cape

Town, who were nominated under the Project, participated in JICA's Leakage Control Training Course in February 2020.

(6) Others (Handover Ceremony)

As described in the above Chapter 6-1 (4), handover ceremony was held.

Livestreaming by web meeting platform, online video platform and project plaque and so on were sponsored by JICA.

Chapter 7 Project Achievements and Way Forward

7.1 Achievement of Outputs

(1) Achievement of Output 1

"Skill development, status-quo and challenges of NRW, and needs in municipalities are analyzed and shared with stakeholders."

All indicators of Output 1 were achieved as shown in Table 7-1.

Table 7-1: Achievement of Output 1

No	Indicator	Final Monitoring based on PDM_3 and PO_6
1-1	Analyzed/organized information of skills development of municipalities is submitted to DWS.	- Information was compiled as a baseline survey report (refer to Chapter 3.2).
1-2	Analyzed/organized information of NRW and needs of municipalities is submitted to DWS.	- Information was compiled as a baseline survey report (refer to Chapter 3.2).
1-3	Benchmarked matrix of Japan and South Africa on water services is submitted to DWS	- A benchmark report was prepared by delegation officials in the 1st training in Japan and submitted to the DWS management (refer to Chapter 3.4). - A benchmark report was prepared by delegation officials in the 2nd training in Japan and presented in the 2nd facilitator technical meeting (refer to Chapter 3.4).
1-4	Information sharing occasions are provided.	- Information of the Project including the National NRW Training, its concepts and efforts/challenges in water supply sector of both countries was shared with stakeholders through occasions such as physical/online meetings, forums, workshops, seminars, websites and media (refer to Chapter 3.5).

(2) Achievement of Output 2

"IBTC's National NRW Training capacity is improved."

All indicators of Output 2 were achieved as shown in Table 7-2.

Table 7-2: Achievement of Output 2

No	Indicator	Final Monitoring based on PDM_3 and PO_6
2-1	Appropriate organizational structure for the National NRW Training is established at IBTC.	- Organizational structure for the National NRW Training was established in collaboration with facilitators (refer to Chapter 4.3).
2-2	No. of revision of Standard Operation Procedures (SOP) of the National NRW Training is increased.	- SOP was developed and reviewed as a training package (refer to Chapter 4.4 and 4.5).
2-3	No. of revision of the National NRW Training Business Plan is increased.	- The Business Plan was prepared and reviewed in accordance with TOR of the steering committee of the National NRW Training (as a part of sustainability plan) (refer to Chapter 4.1 and 4.6).
2-4	Sustainability plans including steering committee or equivalent for the National NRW Training are finalized.	- A sustainability plan for the National NRW Training for the next 3 years was developed (continuously be revised), and interim steering committee meeting was held in March 2021 (refer to Chapter 4.9).

(3) Achievement of Output 3

"The National NRW Training is conducted with training improvement cycle."

All indicators of Output 3 were achieved as shown in Table 7-3.

Table 7-3: Achievement of Output 3

No	Indicator	Final Monitoring based on PDM_3 and PO_6
3-1	No. of Facilitator Technical Meeting is increased.	- The meetings were conducted four times: physically twice in 2019 and online twice in 2020 (refer to Chapter 5.7).
3-2	No. of National NRW Training is increased.	- The trainings were conducted three times: physically the 1st and 2nd groups/intakes in 2019 and 2020, and online the 3rd group/intake in 2020 (refer to Chapter 5.9).
3-3	Learners' satisfaction scales are kept high or increased.	- All three trainings for the 1st, 2nd and 3rd groups/intakes were evaluated at high rate respectively by learners (refer to Chapter 5.10).
3-4	Feedback/utilization of skills, knowledge and outcomes into water services of participating municipalities is increased.	- As a built-in outcome of the training, skills and knowledge trained were utilized practically into the workplace component and reflected into pilot results presentations (refer to Chapter 5.11).

7.2 Achievement of Project Purpose

"NRW management skills are developed for participating municipalities through the National NRW Training by IBTC."

Table 7-4 shows the achievement level of the indicators set to measure the Project Purpose. Although some of these indicators were not achieved because of difficulty under the COVID-19 circumstances such as items No. 2 and No. 5, it can be argued that the Project has made significant achievements.

Table 7-4: Achievement of Project Purpose

No	Indicator	Final Monitoring based on PDM_3 and PO_6
1	No. of the National NRW Training is increased (three times or more).	- Trainings were conducted three times: physically the 1st and 2nd groups/intakes in 2019 and 2020, and online the 3rd group/intake in 2020 (refer to Chapter 5.9).
2	No. of pilot DMAs for problem solution is increased (11 or more).	- Seven participating municipalities of the 1st and 2nd groups/intakes established pilot DMAs as workplaces, but the 3rd group/intake didn't do it due to suspension of the workplace component by COVID-19 pandemic (refer to Chapter 5.2).
3	No. of facilitators is increased (adequate resources to conduct the Training: 16 or more).	- More than 16 facilitators from municipalities and DWS have engaged (refer to Chapter 5.3 and 5.9).
4	No. of learners is increased (44 or more from 11 participating municipalities and others).	- More than 55 learners from 10 municipalities and DWS regions participated (refer to Chapter 5.9).
5	No. of debrief reports as outcomes are prepared (11 or more).	- Seven participating municipalities of the 1st and 2nd groups/intakes prepared debrief presentations (refer to Chapter 5.11).
6	Learners' satisfaction scales are kept high or increased.	- All three trainings for the 1st, 2nd and 3rd groups/intakes were evaluated at high rate respectively by learners (refer to Chapter 5.10).
7	Steering committee's kick-off meeting is held.	- The steering committee's interim meeting was held with nominated member organizations in March 2021. DWS and SALGA will establish the committee officially in the beginning of the financial year 2021/22 (refer to Chapter 4.9).
8	Business plan, SOP, teaching/learning materials, committee TOR are finalized as Version-1.	- Business plan, SOP, teaching/learning materials, committee TOR were finalized (refer to Chapter 4.5, 4.6, 4.9 and 5.6).

7.3 Sustainability Plan and JICA's Follow-up Supports

As described in Chapter 4.9, the Project developed the Sustainability Master Plan of the National NRW Training for the post-Project three years to ensure sustainability.

While DWS/IBTC and SALGA together with partners will implement the plan through strategic actions under three pillars explained in Chapter 4.9 (1), JICA will consider follow-up supports as a component of the plan by following strategic actions:

JICA's Follow-Up Supports (Strategic Actions)

A) JICA will offer Training Programme in Japan for steering committee members, facilitators and/or municipalities.

B) JICA will dispatch short-term JICA experts to South Africa to follow up the 3rd workplace training on site, which was not conducted due to COVID-19 pandemic.

C) JICA will dispatch a long-term JICA expert to the Development Bank of Southern Africa (DBSA), and one of his duties is to monitor the National NRW Training.

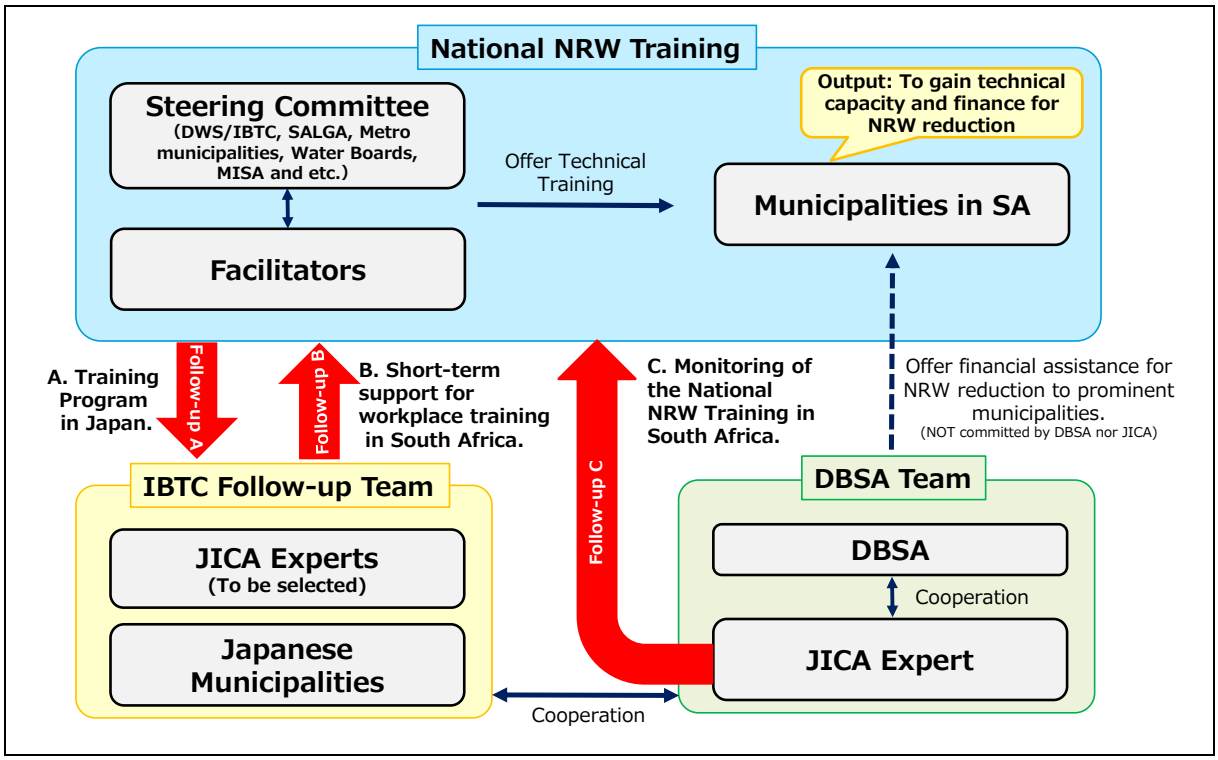


Figure 7-1: JICA's Follow-up Supports (Strategic Actions)

7.4 Lessons learnt from the Project

The lessons learnt from the Project are as follows:

- Neither South African side counterpart is in a position to directly take charge of the water supply services. DWS is a jurisdictional Department of South Africa's water and sanitation sector and SALGA supports municipality's water administration. NRW handled by the Project is a daily problem faced by municipalities as WSA, and since the municipalities have the problem recognition and expertise, even with the support of SALGA, it has been difficult for DWS/IBTC at the national government department level to conduct the National NRW Training on its own.
- In order to make up for this point, the Project promoted the benchmark of human resource development of water utilities by the Japan Water Works Association (JWWA) through training-in-Japan programme and the joint Seminar. This set the key concept of the National NRW Training "by municipalities, for municipalities" and realized the Training by encouraging major South Africa's municipalities in the Training as facilitators. Although both municipalities and facilitators have supported the concept, it was not easy to assign/allocate facilitators as planned because of the municipality's personnel limitation and their routine work.
- The Project focused on developing and conducting the National NRW Training as an effective training, that is useful in the field and lead to problem solution, prior to the accreditation of the Training. In contrast, in South Africa, qualification system/framework has been built mainly with reference to those in Europe or other counties. Hence the lack of accreditation makes it difficult to secure grants from SETA and other government entities because of the non-accredited training. Therefore, accreditation of the Training for qualification is indispensable from the South African context.
- The Project aimed to link multi-sectors of South Africa: the water sector, the local government sector and the human resource development sector. Due to the existing differences between relevant frameworks, systems and terms in South Africa and Japan, South African counterparts and JICA Experts faced the various difficulties in communication; however, both sides overcame them by patiently communicating and clarifying understanding.

7.5 Immediate Issues

The immediate issues for the post Project are as follows:

- Strengthening Structure: Under the leadership of DWS/IBTC and SALGA, the cooperative structure with the DWS's relevant Directorates and stakeholders such as partnering municipalities should be maintained and strengthened.
- Human Resources: It is important to ensure the active and stable participation of facilitators and DWS's officials for the National NRW Training. Hence, DWS/IBTC and SALGA should mobilize them systematically not in each training group/intake but in an annual cycle, and secure training personnel through close coordination and logistics arrangements. In addition, DWS/IBTC and SALGA should continue the facilitator technical meeting (or the 2nd tier group under the Steering Committee) and enhance talent pool and training of the facilitators.
- Financial Resources: To make the budget for the training recurrent, DWS/IBTC should enhance the

status of the National NRW Training in DWS by regular reporting, information disclosure and in-house publicity.

- Financial Resources: Through DWS/IBTC's public relation (including improvement of the DWS's website) and the SALGA's platform, DWS/IBTC should diversify financial resources from stakeholders including SETAs' grants by making an appeal of the National NRW Training, its outputs and effectiveness as well as by aligning with newly-developed qualification WRP based on compatibility for obtaining accreditation.
- Physical Resources (including facilities): In the training with the cooperation of stakeholders and participation of municipalities, it was confirmed that the IBTC's IT/ICT environment should be updated/enhanced regularly to share, exchange and accumulate training data (training documents, information and teaching/learning materials) with those organizations as well as to provide online training more smoothly.
- Steering Committee of the National NRW Training: An interim steering committee was held, but DWS and SALGA should initiate the official steering committee immediately (not established yet as of May 2021) and advance the sustainability master plan powerfully.
- Business Plan of the National NRW Training: DWS/IBTC and SALGA should review the Business Plan regularly and brush up the training in accordance with the above financial resources and decision making by the steering committee.

7.6 Suggestions for Overall Goal

Upon the completion of the Project, suggestions for overall goal are as follows:

- Through conducting the National NRW Training with the key concept "by municipalities, for municipalities" with support from stakeholders, the training programme is for not only providing the training on NRW management skills, but also reflecting municipality's information, issues and knowledge in planning and policy making effectively, which are obtained from the Training and discussions among participants and stakeholders in the Training.
- For the above, DWS/IBTC, SALGA and partners should take advantage of the Training as not just skill development provision but a strategic tool for NRW reduction nationwide in annual programme and 3-years programme of the sustainability plan (including the JICA's follow-up supports as described in Chapter 7.3), further medium- and long-term timeframe.
- IBTC should aim to be a hub (centre of excellence) to continue conducting the National NRW Training steadily and strengthen the business model. However, it is difficult for IBTC to provide skill development for municipalities nationwide in vast area of South Africa. Therefore, DWS and SALGA should consider increasing the training resources (other training yards and/or facilitators in regional cores) and building up a regionally-based system to expand the training programme with support from stakeholders in medium- and long-term perspective. To that end, DWS and SALGA should strengthen

cooperation with provincial offices, major metropolitan municipalities and Water Boards. Moreover, it is expected that DWS and SALGA will involve stakeholders and discuss the establishment of an association such as JWWA or the addition of similar functions and roles to existing institutions/organizations.

- It is also expected for DWS/IBTC to aim at being a centre of international human resource development and NRW reduction by actively accepting participation by water-related officials from other countries, especially Southern African or Southern African Development Community (SADC) countries.
- In South Africa, there is a gap between existing plumber qualifications (mainly for domestic plumbing) and plumber's skills required for water services. Therefore improvement in quality work of installation and its supervision of service connections seems to be a major issue. The service connection consisting of service pipes and customer meters often causes water leakage and illegal connections. As presented in the SALGA-JWWA joint seminars, it is desirable for the South African water sector to discuss service connection quality assurance system nationwide like those of Japan, specifically "Designated service connection plumbing contractor system" and "Service connection chief/artisan plumber".
- Through project activities, it has been observed that private companies exclusively manage information and data on water services in some municipalities. While utilizing their know-how and technologies, it is essential for municipalities to strengthen their capabilities at both organizations and induvial levels, and manage water services on their own for NRW reduction.
- Lastly, most of the participating municipalities have lacked budgets to execute NRW management and reduction with preventive manners. While focusing on NRW reduction as the Super Goal "NRW ratios decrease in participating municipalities utilizing the NRW management skills obtained from the National NRW Training." (refer to the note in PDM_3 in Table 1 of the front pages), DWS and SALGA should take into consideration a system which includes financial support to participating municipalities for their actions and project implementation after their participation in the National NRW Training.