Water Supply Administration
For Better Management of Water Supply Services
Course（Ｂ）

Country Reports

Japan International Corporation of Welfare Services (JICWELS)

Contents

Water Supply Administration
For Better Management of Water Supply Services
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CAMBODIA

Water Supply Administration for Better Management
of Water Supply Services

Improvement of Human Resource Development

09 Nov 2018

Name: PICH SAMBATTRATTANAK
Position : Chief of Technical Office
Department of Technical and Project Management
Ministry of Industry and Handicraft

Improvement of Human Resource Development (Technical for water production and water quality)

Because of our department just established since 2017, so our department faces some problems as:

- **Lack of human resources in term of quantity and quality**
- **Lack of capacity of water supply providers**
- **Poor performance of private water operators**

Improvement Plan Worksheet

No	Activity to be carried out	Resources required	Person Responsible	Due Date	Estimated costs (USD)	Expected Outcome	Indicators for verification
1	- Direct training to my departme nt's staffs including OJT	- Get approval from the top manageme nt and collaborate with DPs if possible	Departme nt of technical and project managem ent, Ministry of Industry & Handicraft	Early in 2019 and conti nuou sly	- 100 USD/ti me	- Upgrade knowledge for our staff	- Checking their ability with real practice
2	- On site training with private water operators				- Over 100 USD/ti me	- Improvem ent of water quality and appropriat e operation	- Checking their own report and recording file

3

Activity to be carried out

1. Direct training to my department's staffs including OJT for O&M of rapid sand filter operation and others
2. On site training with water private operators

4

Input (Resources required)

All kind of our activities have to get approval from the top management first and if necessary, collaborate with DPs.

5

Person Responsible and role

- Technical office's staff, Department of technical and project management and relevant department, Ministry of Industry & Handicraft

6

Due Date

1. Start in early 2019 (Many time will apply)

2. Start from now and continuously

Expected Outcome

- Upgrade knowledge for our staff regarding to technical for water production and water quality
- Improvement of water quality and appropriate operation

Estimated costs (USD)

1. 100 USD/time (Many time as possible)
2. Over 100 USD/time (Routine Work)

9

Indicators for verification

- Checking their ability with real practice and questions

- Checking their own report and recording file (Before and After training)

10

Thank you for your attention

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HAITI

Water Supply Administration for Better Management of Water Supply Services

Project for connecting new customers to the Leogane Water Supply Services

1. Country: Haïti
2. Name: Grégory RÉGIS
3. Position: Engineer Studies
4. Organization: DINEPA

CTE of Leogane

RÉPUBLIQUE D'HAÏTI
DINEPA
Direction Nationale de l'Eau Potable et de l'Assainissement

Contents of Improvement Plan Presentation

- ✓ **Plan Title:** Connection of new customers to the Leogane Water Supply Services
- ✓ **Background:** At Leogane the situation is very critical. Most of the people use only well water without any treatment. it is in this vein, we will undertake the aforementioned project.

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DINEPA
Direction Nationale de l'Eau Potable et de l'Assainissement

- ✓ **Background:** Non satisfaction of the demand of the customers (95.8% non served, non connected)
- ✓ **Input :** Founding, Qualified staff, Adequate equipments, Adequate materials to connect new customers (About 99,699 new customers => 16,616 new connections).

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Direction Nationale de l'Eau Potable et de l'Assainissement

- ✓ **Activity:** Connect 99,699 new customers (16,616 connexions to make).
- ✓ **Due Date:** 2018 – 2021
- ✓ **Outcome:** Satisfy the population concerned by the project (Our new customers)
- ✓ **Cost:** US$16,912,117.99
- ✓ **Verification :** Estimate Cost and Typical service connection

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Draft of Improvement Plan

The main point in this project is to connect the customers above, for that we have:

- Acquisition and installation of: a) Water meters and accessories; b) Support collars and accessories; c) The stop valve; d) Connection pipes.

- Service pipes connection - Convince the customers to be connected to our water supply services - Supervision the works of the private company

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Direction Nationale de l'Eau Potable et de l'Assainissement

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- Background/Considering real situation of your
  - Workplace: Place under negotiation
  - Division: To organize after the JICA Training
  - Department: To organize after the JICA Training
  - Organization: CTE of Leogane / DINEPA
  - Country: Haiti

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DINEPA
Direction Nationale de l'Eau Potable et de l'Assainissement

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Improvement Plan Worksheet

Activity to be carried out	Resources required	Person Responsible	Due Date	Estimated costs(US)	Expected Outcome	Indicators verification
1) Demolition, road repairs, earthworks and evacuation. 2) Acquisition and installation of: a) Water meters and accessories; b) Support collars and accessories; c) Stop valve; d) Connection pipes. 3) Communications and public awareness work4) 4) Unexpected 5) Supervision of the works	Manpower : -Services from competences of private Company, -Place: The local of the reservoir - Equipment : Excavator, wheel wrench, pickaxe, jackhammer, compactor - Training : Increase the skills of the staff for the work to do. Information : Available devices (900 water meters)	The Director of the CTE of Leogane	2018 - 2021	Sixteen Million Nine Hundred Twelve Thousand One Hundred Seventeen and Ninety Nine Cent US$ (US$16,912, 117.99)	Connect 99,699 new customers (16,616 connexions to make)	- Estimated Cost - Typical service connection

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DINEPA
Direction Nationale de l'Eau Potable

Input (Resources required)

List inputs from your side,

Manpower : Services from competences of private Company,

Place : The local of the reservoir

Equipment : Excavator, wheel wrench, pickaxe, jackhammer, compactor

Training : Increase the skills of the staff for the work to do

Information : Communication for convince the customers to use our water supply services.

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Direction Nationale de l'Eau Potable et de l'Assainissement

Person Responsible and role

- **Keyperson:** The Director of the CTE of Leogane
- **Key Ministry:** Ministry of Public Works, Transportation and Communication (MTPTC)
- **Task force:** The Director of the CTE of Leogane.

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Direction Nationale de l'Eau Potable et de l'Assainissement

Activity to be carried out

- Demolition, road repairs, earthworks and evacuation. - Acquisition and installation of:

a) Water meters and accessories;

b) Support collars and accessories;

c) Stop valves. - Connection pipes.

- Communications and public awareness work. – Unexpected - Supervision of the works.

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Due Date

- **Short Term:** 2018 - 2021

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Expected Outcome

Connect 99,699 new customers (16,616 connexions to make)

CTE Leogane

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Direction Nationale de l'Eau Potable et de l'Assainissement

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Estimated costs (USD)

Sixteen Million Nine Hundred Twelve Thousand One Hundred Seventeen and Ninety Nine Cent US$ (US$16,912,117.99)

CTE Leogane

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DINEPA
Direction Nationale de l'Eau Potable et de l'Assainissement

Indicators for verification

No	Activity	Unit	Quantity	Unit Price	Total Price
1.-	Demolition, road repairs, earthworks and evacuation	u	16,616.00	85.00	1,412,360.00
2.-	Acquisition and installation				
a.-	Water meters and accessories 3/4"	u	15,716.00	200.00	3,143,200.00
b.-	Support collars and accessories 2"x3/4"	u	16,616.00	5.00	83,080.00
c.-	Stop valve 3/4"	u	16,616.00	266.00	4,419,856.00
d.-	Connection pipes 3/4 " PE	m	99,696.00	26.00	2,592,096.00
3.-	Communications and public awareness work	FF	1.00	18,000.00	18,000.00
4.-	Unexpected	FF	1.00	583,429.60	583,429.60
5.-	Supervision of the works	FF	1.00	1,225,202.16	1,225,202.16
	ESTIMATED COST				**13,477,223.76**

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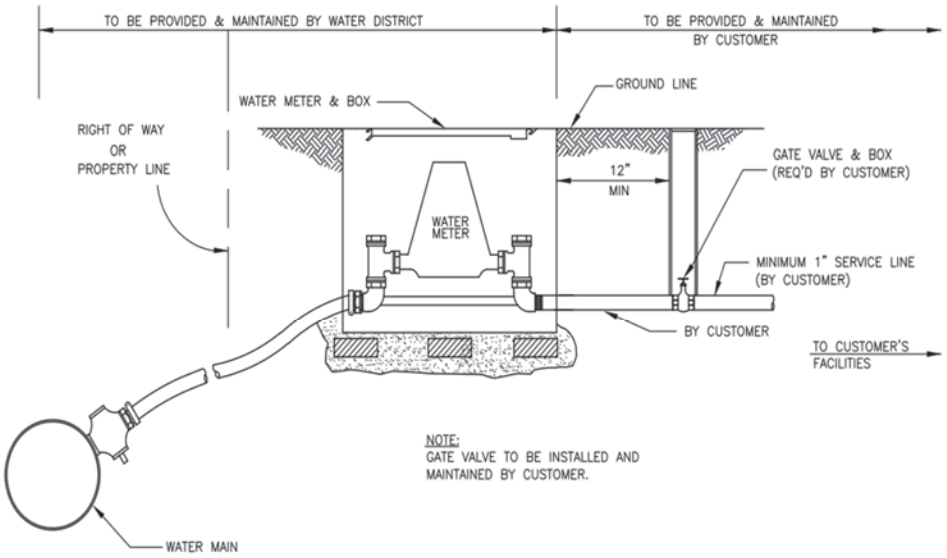
DINEPA
Direction Nationale de l'Eau Potable et de l'Assainissement



TYPICAL WATER SERVICE CONNECTION

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Direction Nationale de l'Eau Potable et de l'Assainissement

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Water Supply Administration
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INDIA

DRAFT OF IMPROVEMENT PLAN

PLAN TITLE :

• **Proposal for construction of Water Supply System of North Eastern Regional Institute of Water and Land Management (NERIWALM) Campus at Tezpur, Assam, India.**

Mr. SUNAR Saligram (India)

BACKGROUND :

- **The Water Supply System of NERIWALM, Tezpur, Assam, India was constructed more than 40 years back to meet the demand of safe drinking water for the residents of the campus which was approximately 250 in numbers.**
- **Water demand increased. It will be a MODEL for other agencies to execute such projects in a bigger way.**
- **Ground water is the only source of water.**
- **The under ground water contained heavy concentration of Iron,(7-12mg/l), Arsenic (3-5mg/l) along with other impurities.**

PERSONS RESPONSIBLE AND ROLE :

- **Keyperson :**
- **Assistant Director (Civil) :** Responsible for putting up the proposal to the Review Committee Meeting headed by the **DIRECTOR** for allocation of budget for the work after giving due justification why the work is necessary to be carried out.
- **Key Section/Division/Department/Ministry :** Construction and Maintenance Section of NERIWALM.
- **Task Force :** The Task Force consist of Deputy Director, Asstt. Director (Civil), Junior Engineer (Civil), Multi Tasking Service and Pump Operator and Plumber. The work is usually carried through Contractor having experience in similar nature of works and with good financial background selected by the Tender Committee after open bidding.
- **Steering Committee, etc :** A Construction Committee headed by the **Director** and Members drawn from other works department such as Public Health Engineering Department, Public Works Department, Accounts Officer and Assistant Director reviews the quality and progress of the work from time to time.

INPUT (Resources required) :

- **Population of the Campus = 500 persons**
- **Requirement of Safe Drinking water (as per Bureau of Indian Standard)**

1x135x500 = 67500.00 Ltrs or 67.50 M3 Say 68.0 M3/day

MANPOWER

- As the work will be carried out by the Contractor having experience in similar nature of works the department will more or less be limited to Supervisory in nature such as Quality Assurance and Overall Progress. The manpower requirement will be as follows.
- **i) Assistant Director (Civil) :** He will be responsible for overall quality and progress of the work. He has to see that the work in completed within the stipulated time period and there is no cost over-run. His responsibility is to report to the Steering Committee from time to time over the progress of the work vis-a-vis Financial Achievement.
- **ii) Junior Engineer (Civil) :** He will be directly responsible at the construction site to oversee the quality and progress of the work. He will be assisted by Supervisory level staff (preferably - 2 Nos). They all be reporting to the Assistant Director (Civil).
- **iii) Junior Engineer (Electrical/Mechanical) :** For all electrical and mechanical works being carried out satisfactorily the JE (Elect/Mech) will be responsible and in turn report to the AD©.
- **iv)** In addition to the above staffs, the Contractor will have to engage his Engineers for supervision and carrying out the works as per the given drawing and schedule.

PLACE, EQUIPMENT, TRAINING @ INFORMATION, ETC

- **Place :** NERIWALM Campus at Dolabari, Tezpur, Assam, India.
- **Equipment :** Since the work will be out-sourced to a Contractor, the Contractor will have to arrange for all the equipments required for carrying out the work. It will be clearly spelt out in the Tender Documents.
- **Training :** Training for the manpower of NERIWALM would be arranged as and when required.
- **Information, etc :** Information as and when required would be provided from time to time in the form of activity chart, information brochure will be made available to concerned authority.

ACTIVITY TO BE CARRIED OUT :

- Budgetary Provision is made for the work clearly specifying the name of the work.
- Detailed Planning and DPR Preparation of the project along with Cost Estimate is made by engaging a Government or a Private Agency (selected through open bidding system).
- Obtaining necessary Administrative and Financial Approval for the project.
- On obtaining A & F Approval, **ONLINE Tenders** are to be invited from Bidders having experience in similar type of works (since the amount involved is not so big Global Bidders may not participate, hence limited within India)**.**
- Comparative Statement of the parties participating in the ONLINE Tender are prepared and placed before the **Tender Committee** for allotment of the work. Based on the detail document provided by the bidder and the quoted rate, the Tender Committee allots the work to most deserving party.
- Letter of Intent/Work Order issued to the party for execution of Agreement and start of work.

DUE DATE :

- The Water Purification Plant is expected to be completed in the Financial Year 2019-20.

ESTIMATED COST :

1.	CIVIL WORKS	INR 2,91,92,500.00
2.	BORING OF PIPE	INR 1,15,000.00
3.	PUMP MOTOR, PIPELINE NETWORK COMPLETE AND OVERHEAD TANKS, ETC.	INR 15,50,000.00
4.	SUPPLY, INSTALLATION & COMMISSIONING OF MEMBRANE FILTER UNIT, ACTIVATED CARBON UNIT CHLORINE INJECTION UNIT.	INR 2,00,00,000.00
5.	ELECTRICAL WORKS	INR 29,19,250.00
6.	OFFICE FURNITURE & EQUIPMENTS	INR 20,00,000.00
	TOTAL	INR 5,57,76,750.00
	CONTINGENCY @ 3%	INR 16,73,303.00
		INR 5,74,50,053.00
	SAY	INR 5,74,50,000.00
	CONVERTING TO US DOLLAR	USD 7,97,917.00
	SAY	USD 7,98,000.00

EXPECTED OUTCOME :

- The expected outcome of the project will directly benefit 500 residents of the NERIWALM Campus by way of getting safe drinking water thereby making the residents free from water borne diseases which is commonly prevalent in the area. Providing safe water has been the Government Policy in the form of National Rural Water Drinking Programme (NRWDP) both by Central as well as respective State Government.
- If the project is successfully completed and implemented, it may serve as a **MODEL** for other agencies to replicate such type of projects on a bigger scale and for larger number of the population at the district and block level.
- NERIWALM being a water and land management institute it can play a lead role in promoting such projects in the eight states of the North Eastern Region of India in particular and India in general.

INDICATORS FOR VERIFICATION

The following Performance Indicators will be used for verification.

- Reliability : Better water quality.
- Stability : 7 hours stable water supply.
- Sustainability : 25 years.
- Management : Imposition of water tariff , obtaining subsidy from the government and consultancy fee to be charged from interested agencies.

ARIGATO & THANKYOU

FOR GIVING A PATIENCE HEARING TO MY PRESENTATION.

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LAOS

LAO PEOPLE'S DEMOCRATIC REPUBLIC

Vientiane Capital

Improvement Plan of Water Supply condition in Vientiane Capital

Target: Production Capacity, Coverage area, Supply pressure, NRW ratio

Country: Lao People's Democratic Republic

Name: Houmphanh OUDOMSAVATH

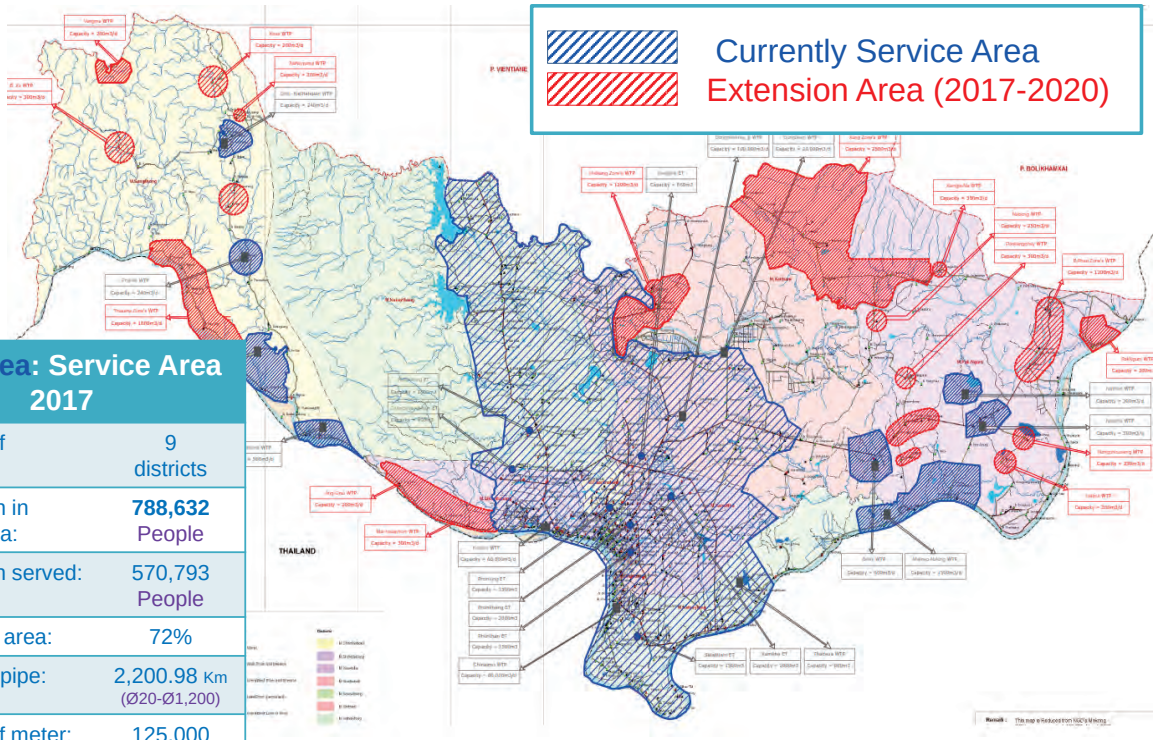
Position: Manager of Technical and Production Division

Organization: Vientiane Capital Water Supply State Enterprise

Contents

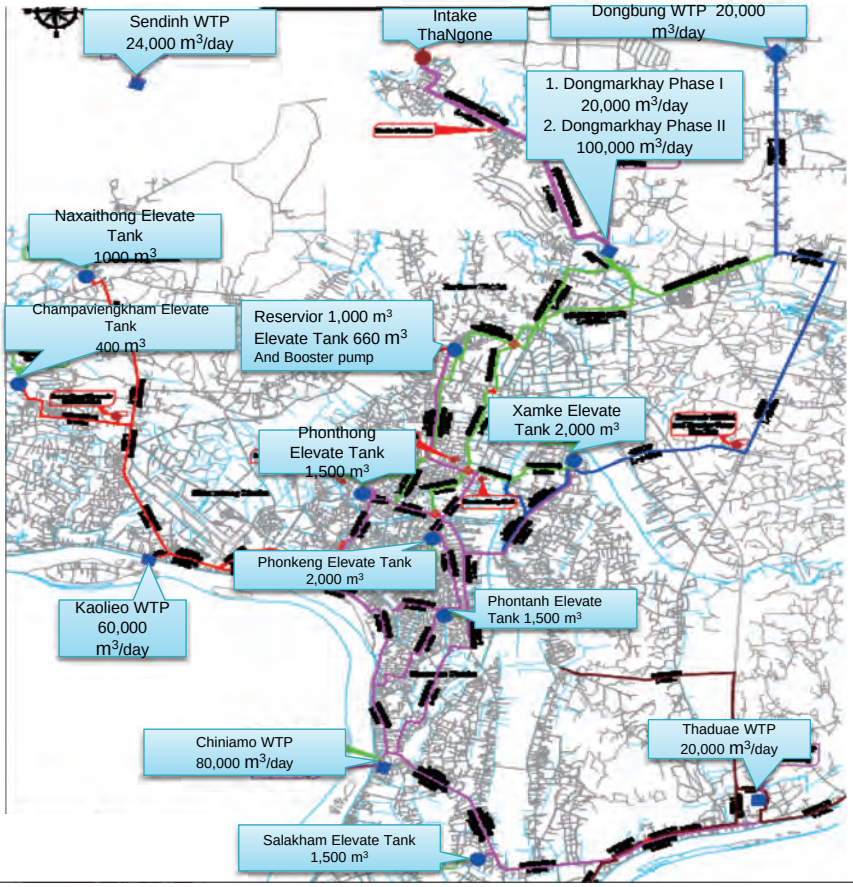
1. Background
2. Input (Resources required)
3. Activity
4. Due date
5. Outcome
6. Cost
7. Verification (Evaluation)

1. Background



Blue area: Service Area 2017	
- Number of districts:	9 districts
- Population in Service area:	**788,632** People
- Population served:	570,793 People
- Coverage area:	72%
- Length of pipe:	2,200.98 Km (Ø20-Ø1,200)
- Number of meter:	125,000 Connections
- NRW ratio:	32.59%

1.1. Background



2. Input (Resources required)

Manpower and equipment

Staff :

20 People (1 ERT = 3persons)

1 Team leader (Technician)

2 Field assistants (Plumber)

5 People Driver for Backhoe

Vehicles:

4 Mini excavator (Backhoe)

1 backhoe loader

6 pick-up (1000kg)

1 Truck (5000kg)

1 Dump truck(Cap. 4m3)

2.1 Input (Resources required)

Leak detection equipment

FUJI, Iron Pipe Location FL-81

FUJI , PL-960

FUJI, FJN-501

Kawatetsu TI-50K

Ultrasonic Flow meter UFP20

FUJI , HG-10AII

FUJI , NPL-100

Chamber SEWERIN Ferrotec

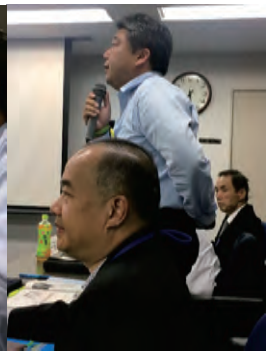
FUJI , FSB-8D

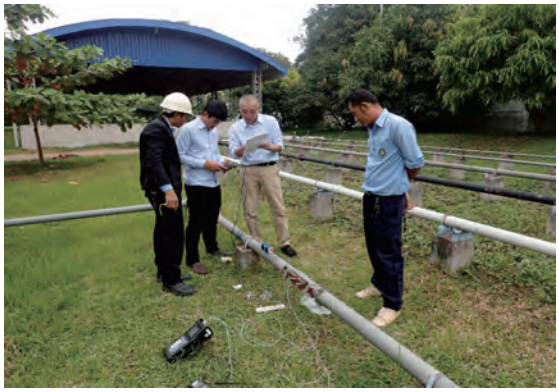
DNR18 WATER LEAK DETECTOR

Sound listening stick Boring bar

2.2 Input (Resources required)

Training block sector preparation (DMA)





2.3 Input (Resources required)

Temporally pipe removal due to infrastructure



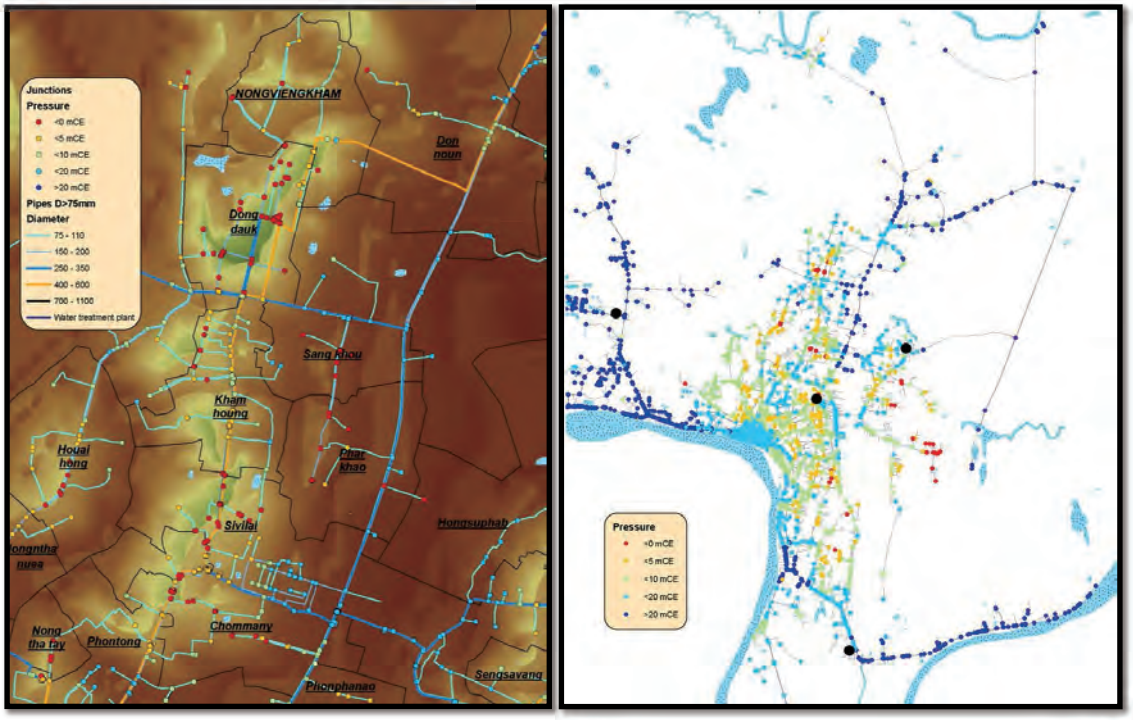

2.4 Input (Resources required)

Valve survey information




2.5 Input (Resources required)

Hydraulic modeling simulation



2.6 Input (Resources required)

Commercial Losses:

1. Verify flow meter in water treatment plant , collecting, calibrating and replacing with deficient flow meter.
2. Verify domestic meter with database updating and after that replace all the anomalies domestic meter.
3. Verify and collect data of large consumer for meter replacement.

2.7 Input (Resources required)

Meter replacement in WTP

2.8 Input (Resources required)

Domestic meter replacement

1. Improving meter organization chart
2. Workshop for meter test bench and repair
3. Schedule for meter replacement in each branches

3. Activities to be carry out

Physical Losses:

1. Standardize quality and dimension of pipe and material.
2. Pipe replacement for distribution and service pipe GSP, PVC.
3. Quick repair after receiving information.
4. Establish call center 1169 (free dial number) permanent 24hr.
5. Updating database for leak repaired on mapping system.
6. Hydraulic modeling simulation

3.1 Activity to be carry out

3.1 Standardize of pipe material

HDPE for Service pipe : 20 - 63mm

DIP for transmission line > 250mm

uPVC for distribution line : 75 - 200mm

3.2 Activity to be carry out

3.2 Pipe replacement for distribution & service pipe, PVC,GSP

uPVC

uPVC

GSP

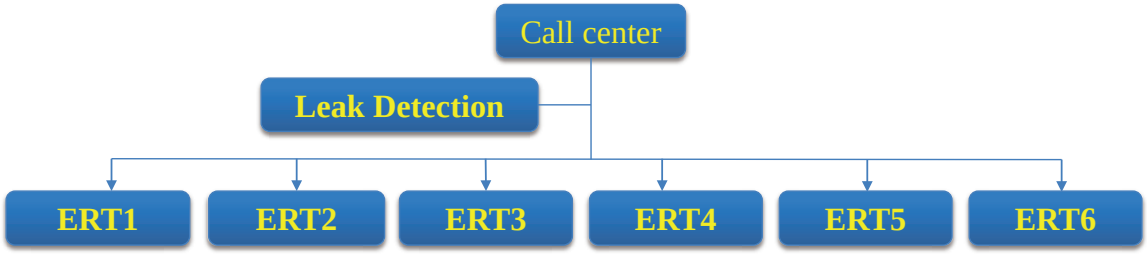
3.3 Activity to be carry out

3.3 Active leakage control (Quick repaired)

Leakage on transmission pipe SP 150mm under asphalt road

3.4 Activity to be carry out

3.4 Call center 1169



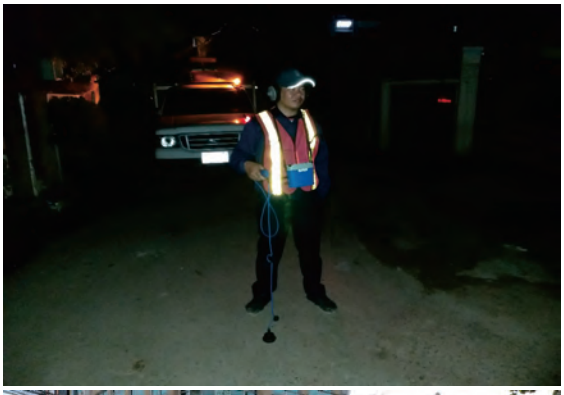
1. Update and upgrade Operation/Call Center for Customers relationship to solve all complaint of water supply system.
2. Establish Emergency Repair Team (ERT) stand by 24 hours for quick repair of pipe leaking.
3. And new equipment required for Leak Detection Team (LDT) to carry out the leak detection work such as, DMA analysis , step testing and sounding with leak detector. Leak correlator, sound listening stick, noise loggers and dataloggers.

3.5 Activity to be carry out

Set up Call Center (Free dial: 1169 for 24 hours)

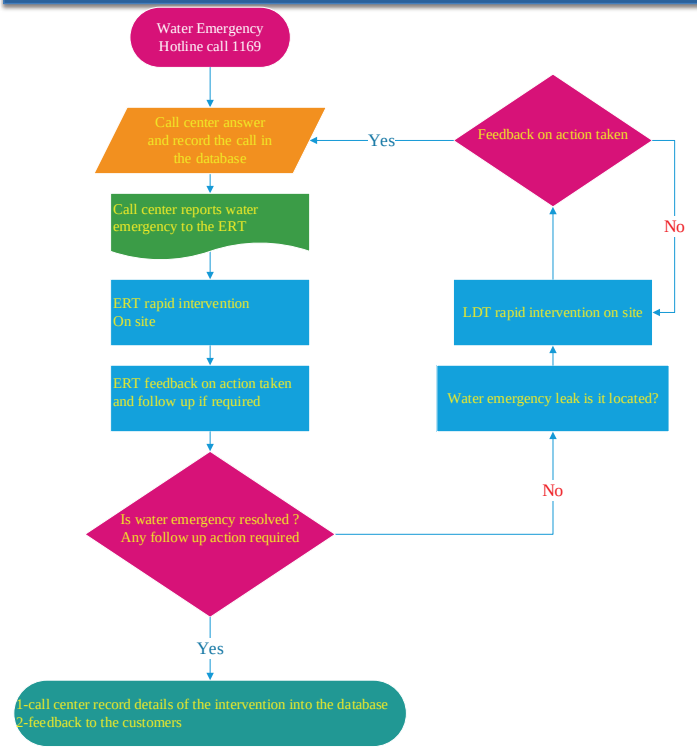
3.6 Activity to be carry out

Listening for leaks

3.7 Activity to be carry out

Emergency Repair Team Working process



4.Due date

Short term: 2018 – 2019

Mid, Long term: 2018 - 2023

5. Outcome

1. Good service both production and supply water for overall areas.
2. Make customer confident and satisfaction
3. Financial stable
4. Company gets profit

6. Costs (US$)

1. **Construction and expansion WTP: 125 millions**
2. **Replace old pipe 100 km: 40 millions**
3. **Extension pipeline network length 178 km: 20 millions**
4. **Meter replacement 60,000 no: 1 millions**
5. **Equipment for leak detection team: 1 millions**

Total : USD 187 millions

7. Verification (Evaluation)

INDICATORS	YEAR 2017	EVALUATION	Goal setting year 2023
Staff/1000 conn.	5		
Production Capacity	280,000 m3/day	Need to improve	400,000 m3/day
Water quality	WHO guideline		WHO guideline
Coverage area	72%		95%
Supply duration	20hours	Need to improve	24 hours
Supply pressure	1 bar		1.5bar
No. of connection	125,000		170,000
NRW ratio	32%	Need to improve	15%
Collection ratio	75%	Need to improve	95%
Staff number	620 persons		700 persons


ຂອບໃຈຫລາຍໆ
Thank you
For your attention

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MYANMAR

NON-REVENUE WATER MANAGEMENT

(LEAKAGE CONTROL)

Presented by
YU YU KYI WIN
Assistant Engineer
Engineering Department (YRDC)

Problems

- High NRW ratio
- Inadequate laboratory services
- Old aged pipes and other infrastructures of water facilities
- Lack of detecting instruments for leakage
- Flat rate unmetered system
- Unsystematic water supply system and distribution networks
- Illegal connections
- Abundance of free water supply to religious and other places and Public water tank
- Large amount of leakages

Problem

Large amount of Leakage

↓

Large amount of NRW

↓

Can't Provide Sound Management

4

❖ **Causes Of Water Leakage**

❖ **Causes Of Water Leakage**

6

To Reduce Non-Revenue Water

- Manpower
- Place (Select the pilot township)
- Equipment (leakage detector equipment)
- Training
- Technical Information provided from lectures and trainings in Japan

(-Efficient water system planning from financial aspect

-Site visit to Training and technical development center, Bureau of waterworks, Tokyo Metropolitan Government

-Leakage detection technology

-Site visit to Tanigahara water purification plant

-Measures against NRW, water supply management and water quality

-Reduction of NRW through leak control,…….)

8

Plan for reduction of water leakages

- Propose the plan to the department
- Select the pilot township
- Estimate the pipe leakage detecting instruments and other facilities
- Estimate the labor costs to implement action plan
- Estimate the duration time to complete leakage detection works for this pilot area
- Report the detail estimations on my action plan to department and take the permission
- Start my plan

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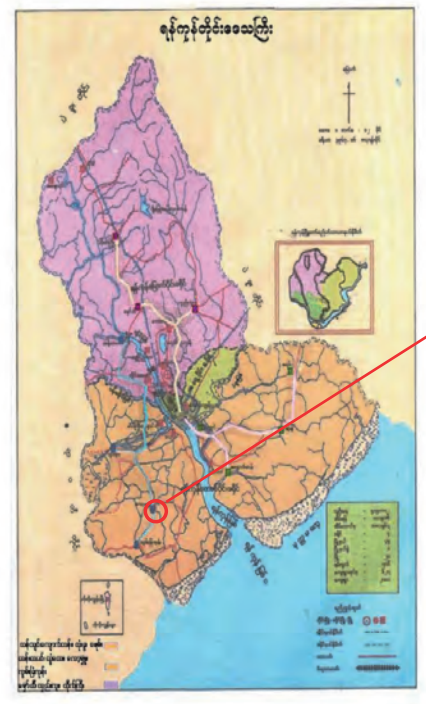
❖ CHOICE THE PILOT AREA



- **Select the Pilot Township** — **Kaumhu**
- **Area** — **1.03 Sq-mile**
- **Population** — **9600 Nos**
- **Coverage** — **63.33%**

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Target

- To REDUCE leakage
- To REDUCE NRW rate

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PROGRESSIVE	BEFORE ACTION PLAN	AFTER ACTION PLAN
WATER LOSSES THROUGH APPEARENT LOSSES & LEAKAGE	16.5 %	10 %
ILLEGAL CONNECTIONS	Unavailable	Available
OTHERS	Unavailable	Available

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Time

- Estimated Duration for Pilot Area

Feasible study time in the pilot area	- 2 month
Estimate the pipe leakage detecting instruments and other facilities and report to department	- 3 months
Duration time of detecting work and repairing works	- 7 months
Total Estimated Duration	**12 months**

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Estimation of Detecting Instrument and Other Facilities

NO	Atems	Quantity	Rate (US$)	Cost (US$)
1	Leak Noise Correlator	2	25000	50000
2	Leak Detector (DNR-18)	4	10000	40000
3	Leak Detector Acoustics Rods	5	150	750
4	Pipeline Repair	-	-	35000
	TOTAL MATERIAL COSTS			125750
7	Estimated Labour Cost for pilot Area	1200	10	12000
	TOTAL COST(MATERIAL+LABOUR)			137750

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Recommendation for future

- We need to control leakage detection and to reduce NRW for all of our townships
- We need to expend our water services
- We need to construct water treatment plants
- We need to change flat-rate unmetered system to water meter system
- We need to introduce DMA System for our townships

Water Supply Administration
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PERU




Water Supply Administration for Better Management of Water Supply Services

Improvement Plan: Monitoring of leakage control programs in large scale WU

María Luisa Zapata Torres

Supervisor I (e)

National Superintendence of Sanitation Services (Sunass)

Peru

Sunass
El regulador del agua potable

Monitoring of leakage control programs in large scale WU (> 40 000 water connections)

- **Background**

Regulation

Regulation of the quality of the provision of sanitation services (Board Resolution Nº 011-2007-SUNASS-CD).

Obligation

WU must elaborate and implement water leakage control programs in distribution networks, annually.

Effect

Even though, Sunass cannot implement a fully training program, its monitoring actions are the starting point, for their persuasive effect.

★ Supervision actions

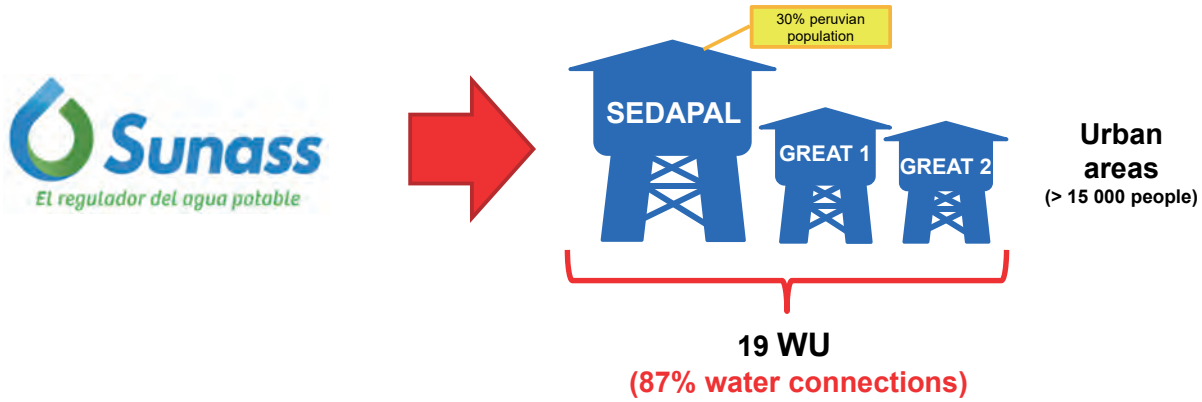
★ Monitoring actions

3

Monitoring of leakage control programs in large scale WU (> 40 000 water connections)

- **Background**

One of the principles in supervision sets that Sunass do not only supervise to find breaches to sanction WU, but to identify risks of non-compliance to act timely and correct those deficiencies. That is why, the **monitoring actions** of Sunass are useful to advise WU staff, in this case, in NRW management.



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Monitoring of leakage control programs in large scale WU (> 40 000 water connections)

- **Background**

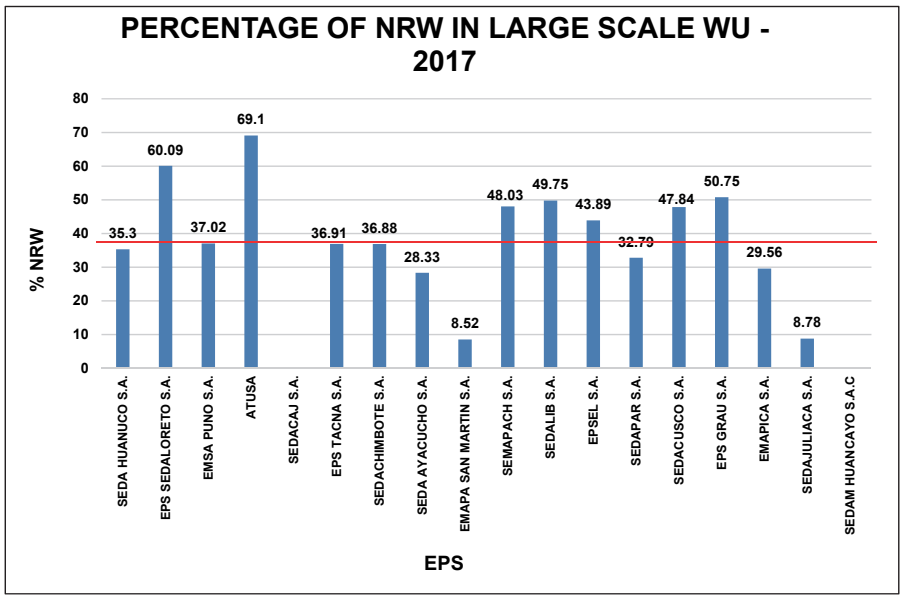
N°	EPS	NON REVENUE WATER (%)				
		2013	2014	2015	2016	2017
1	SEDA HUANUCO S.A.	38.73	36.92	36.81	34.02	35.3
2	EPS SEDALORETO S.A.	60.23	59.11	55.22	56.47	60.09
3	EMSA PUNO S.A.	31.78	39.48	38.51	39.35	37.02
4	ATUSA	69.39	67.29	68.18	67.42	69.1
5	SEDACAJ S.A.	26.45	21.80	23.91	23.77	R.I
6	EPS TACNA S.A.	25.85	29.06	29.35	30.93	36.91
7	SEDACHIMBOTE S.A.	38.19	42.22	44.55	41.49	36.88
8	SEDA AYACUCHO S.A.	31.67	36.32	36.68	35.24	28.33
9	EMAPA SAN MARTIN S.A.	34.14	30.41	30.77	31.52	8.52
10	SEMAPACH S.A.	58.41	56.03	43.16	32.77	48.03
11	SEDALIB S.A.	41.53	43.28	48.44	48.47	49.75
12	EPSEL S.A.	39.82	43.23	44.29	44.24	43.89
13	SEDAPAR S.A.	33.70	29.16	33.98	34.13	32.79
14	SEDACUSCO S.A.	36.19	37.72	35.49	37.81	47.84
15	EPS GRAU S.A.	54.18	53.69	52.51	49.16	50.75
16	EMAPICA S.A.	33.35	34.79	28.85	22.21	29.56
17	SEDAJULIACA S.A.	14.16	14.80	16.24	10.59	8.78
18	SEDAM HUANCAYO S.A.C	26.71	36.06	34.17	35.66	I.I
Large scale WU (Average)*		**38.58**	**39.52**	**38.95**	**37.51**	**38.97**

(*): Without Sedapal S.A.
EPS – SICAP - SUNASS
I.I.:Incomplete information.

5

Monitoring of leakage control programs in large scale WU (> 40 000 water connections)

- **Background**



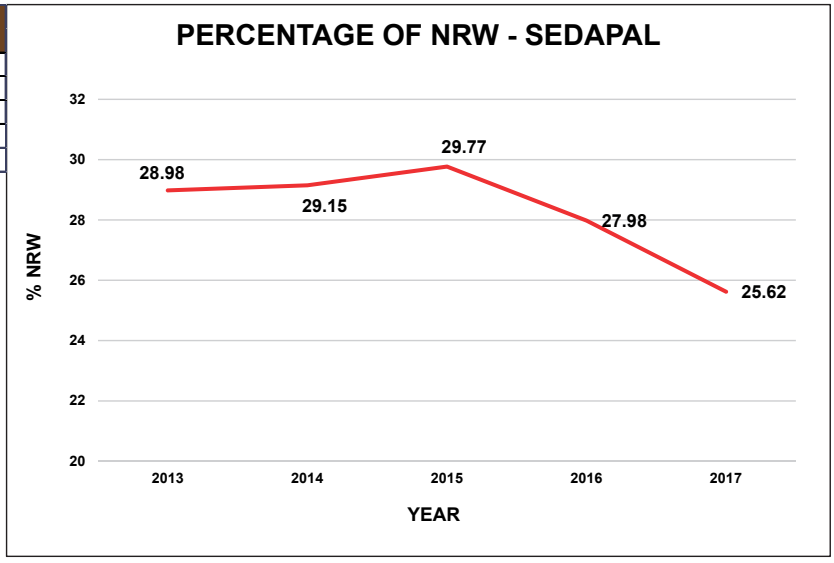
(*): Without Sedapal S.A.
EPS – SICAP - SUNASS
I.I.:Incomplete information.

6

Monitoring of leakage control programs in large scale WU (> 40 000 water connections)

- **Background**

AÑO	ANF
2013	28.98
2014	29.15
2015	29.77
2016	27.98
2017	25.62



EPS – SICAP - SUNASS

7

Monitoring of leakage control programs in large scale WU

Nº	Activity to be carried out	Resources required
1	Define the aspects in the supervision program (monitoring)	Manpower Information
2	Establishment of technical criteria	Manpower Information
3	Execution of monitoring actions	Manpower Information Training
4	Report making	Manpower Information Training
5	Integration of identified needs and reinforce the requirement of their attention by the responsable national entities	Manpower Information

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Monitoring of leakage control programs in large scale WU

Supervision and Oversight Division

Nº	Activity to be carried out	Person responsable	Due date
1	Define the aspects in the supervision program (monitoring)	Supervisors Deputy manager	December 2018
2	Establishment of technical criteria	Supervision specialitst Supervisors Deputy manager	Jan – Mar 2919
3	Execution of monitoring actions	Supervision specialitst Supervisors Deputy manager	Apr – Dec 2019
4	Report making	Supervision specialitst Supervisors Deputy manager	Apr – Dec 2019
5	Integration of identified needs and reinforce the requirement of their attention by the responsable national entities	Supervisors Deputy manage	March 2020

Monitoring of leakage control programs in large scale WU

Nº	Activity to be carried out	Estimated cost (USD)	Expected outcome	Indicators for verification
1	Define the aspects in the supervision program (monitoring)	1 114	Supervision promgram	Program
2	Establishment of technical criteria	5 560	Technical criteria defined	Work plans
3	Execution of monitoring actions	44 950	Monitoring records	Number of signed records
4	Report making	13 520	Reports	Number of reports issued
5	Integration of identified needs and reinforce the requirement of their attention by the responsable national entities	10 400	Report	Report submitted

Water Supply Administration for Better Management of Water Supply Services

Improvement Plan: Monitoring of leakage control programs in large scale WU

Thank for your attention

Sunass
El regulador del agua potable

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PHILIPPINES

Water Supply Administration for Better Management of Water Supply Services

Improvement Plan

Name: Engr. Noriel C. Calpito
Position: OIC Division Manager - Construction and Maintenance
Organization: Baguio Water District

Addressing Water Supply Challenges: Part 1: Climate Change Mitigation, a step in reducing its effects on Water Supply

Pilot Area: Water Sources supplying Km. 8 reservoir

- Water sources supplying Km. 8 are the following:
- Stage 1 camp 6 spring source @ 500gpm;
- Amliang Spring source 400 gpm; and
- Mt. Sto. Tomas Rain Basin @ 700,00 cubic meter
- Km 8 reservoir supplies 5,253 connections; these will be affected when the sources are damaged by climate change or extreme natural disasters

3

KM. 8 RESERVOIR

Km 8 reservoir and water treatment plant; Capacity: 5,687 cu.m.

Part 1: Climate Change Mitigation, a step in reducing its effects on Water Supply

no	Activity to be carried out	Resources required	Person responsible	Due date	Estimated cost	Expected outcome	Indicators for verification
1	Sustainable Manage-ment of Water Resources	Trainings pertaining water resources, structures and capabilities	Water Resources Section in coordination with local environmental units	May 2019	$ 5000-10,000.00 O&M cost,	Improved Water Resources strategies	Improved Water Recovery and Distribution resulting to Connections and Revenue, expansion of service areas Efficient facilities, pipelines

NO	Activity to be carried out	Resources Required	Person Responsible
1	Sustainable Management of Water Resources a. Water shed protection b. Promote / participate in tree planting activities c. Assist in Forest Fire Fighting and Prevention activities	- Adoptable tree species, seedlings - Trainings on fire fighting capability, - Customer Social responsibility (adopt a tree program)	Management Water shed section Other local agencies

NO	Activity to be carried out	Resources Required	Person Responsible
1	Sustainable Management of Water Resources d. Construction of a new or adoption of applicable Treatment plant or processes for water quality	- Adoption of treatment processes learned from JICA Training - Feasibility of using Membrane Filtration process or UV Treatment processes	C & m Division Water Quality Section Engineering Planning and Design
			7

NO	Activity to be carried out	Resources Required	Person Responsible
1	E. Disaster Management Establishment of improved systems and procedures, including S&P in cases of emergencies; Structure and Pipeline design, replacement (adoption of earthquake or landslide proof design, retrofitting of pipeline and structure)	- Seminar/ improvement plan for systems and procedures - Technical Assistance, Training program training in coordination with local and National Departments	Technical Division In coordination with local offices (Engineering office, DENR, etc)
			8

Addressing Water Supply Challenges:
Part 2: Reduction of Non Revenue Water thru comprehensive Pipeline Maintenance Administration

Pilot Area: Loakan Area

- The Water Distribution Area of the BWD is composed of 3 Areas (Area 1, Area 2 & Area 3). A1, A2 has been rehabilitated thus, the subject of these proposals to be presented is a portion of Area 3, in particular Loakan Area.
- BWD NRW is 24.77%
- Loakan area have a total of 3,355 water connections
- Water Source is coming from Amparo pumping station
- With One entry point of water supply

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Part 2: Reduction of Non Revenue Water thru comprehensive Pipeline Maintenance Administration

no	Activity to be carried out (A)	Resources required (B)	Person responsible (C)	Due date	Estimated cost	Expected outcome	Indicators for verification
1	**Proper Water Auditing** Installation of Production meter or use of porta flow	Production Division Commercial Division -Audit Division -NRWMD	Approval from OGM. Div.Heads coordi-nation meeting	July 2019 Continuous activity	$11,000.00 Prod. Meter 1 x $3000 Portaflow 1 x $5,000 Portable Meter tester 1 x $3000	Accurate production and billing data/ record	Upgraded pumping station, meter efficiency testing procedure Accurate water meters

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Part 2: Reduction of Non Revenue Water thru comprehensive Pipeline Maintenance Administration

no	Activity to be carried out (a)	Resources required (b)	Person responsible (C)	Due date	Estimated cost	Expected outcome	Indicators for verification
2	**Enhance ment of Leak Detec-tion and Repair program**	Leak Detection Equipment	C& M Div Water Recovery Team, pipeline maintenance section	Jan 2020	$25,000.00 (1 unit Leak detection equipment	Accurate pin-pointed leaks; Efficient and short duration of repair (s)	.25- .50% NRW reduction every 6 months- 1 year; Reduced O&M

12

NO	Activity to be carried out	Resources Required	Person Responsible
2	**Enhancement of Leak Detection and Repair program**	a. Leak Detection Equipment b. Skills Training Development of BWD personnel locally (proper use of leak detection equipment, calibration and maintenance c. Knowledge capability building for management officers d. Use of new pipe materials, fittings for repair	a. Construction and Maintenance Division head thru the training learned from JICA, JWWA,

13

Part 1: Reduction of Non Revenue Water thru comprehensive Pipeline Maintenance Plan

no	Activity to be carried out (A)	Resources required (B)	Person responsible (C)	Due date	Estimated cost	Expected outcome	In for verification
3	**Leak Management Program**	New Technology on pressure management	C& M Div In coordination with Suppliers in terms of corporate social responsibility (pilot testing)	Dec 2020	$100,000.00 SCADA system (on going study) $ 50,000.00 PRV	Upgraded system	Reduced Leakage Rate per month or year resulting to improved water supply

14

NO	Activity to be carried out	Resources Required	Person Responsible
3	**Leak Management Program**	Unsolicited proposals from suppliers for New Technology on pressure management - Upgrading District Metering Area (DMA) to analyze systems loss on a smaller scale or on a per-subsystem basis (per pipeline segment using the block water supply) - System plotting of leaks for Leakage rate - Management Training at local or international level - Training on system/ program/softwares created by JWWA, Water works Bureau (future program)	C& M Division thru the learnings from the training at JICA

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Water Supply Administration
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TIMOR-LESTEA

REPUBLIC DEMOCRATIC OF TIMOR LESTE (RDTL)

ACTION PLAN

REDUCTION OF NON-REVENUE WATER

(ILLEAGAL CONNECTION CONTROL)

MINISTRY OF PUBLIC WORK

DIRECTORATE OF WATER SUPLLY SYSTEM

FRANCISCO AFONSO
Timor Leste Representative

CONTENT

1. Background
2. Outcome
3. Planning

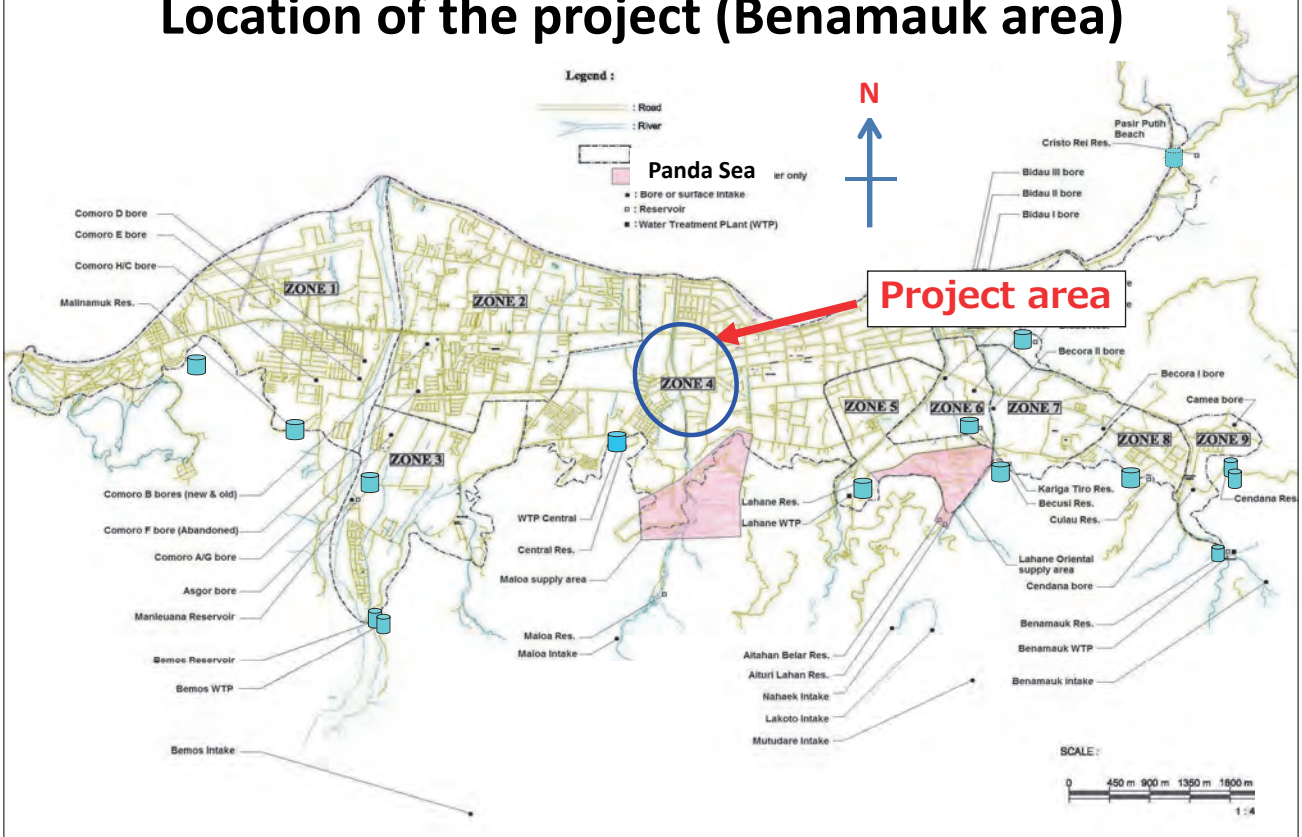
Reduction of Non-Revenue Water

input volume **15,634.424**	Authorized consumption **15,417,212**	Revenue water **1,744,382 (11.31 %)**	Billed authorized consumption	**1,553,484 m^3 /year (10.08 %)**
		Non Revenue Water (NRW) **13,672,830 (88,69 %)**	Unbilled authorized consumption (ex. fire fighting, cleaning)	**190,898 m^3 /year (1.24 %)**
	water losses 217.212		**Apparent losses (Unauthorized consumption (i.e. Illegal use), Customer metering inaccuracies)**	**12,060.700 m^3 /year (78.23 %)**
			Real losses (Leakage)	**1,612.130 m^3 /year (10.46%)**

Water Supply Service Levels

INDICATORS	2000	2018	Goals for 2025
Staff/1,000 connections	12	26	50
Production capacity (m^3/day)	15,000	40,000	70.000
Water quality standards	None	WHO	WHO
Coverage area	10%	**54.5 %**	75 %
Supply duration (hour/day)	2-6	4-12	24
Supply pressure	0.2 bar	0.5 bar	1.0 bar
Number of connections	2600	14.662	50.000
Population Served	20,000	96,866	100
NRW	95%	**88 %**	**50 %**
Collection ratio	1.5%	11%	50%
Staff number	25	64	100

Location of the project (Benamauk area)



Trend in physical leak

Almost physical leaks sink into the ground and usually never appear on the ground because of extremely low distribution pressure(almost zero or pipe has little water.

Under this situation, neither Acoustic bar, Electronic leak detector nor Correlative leak detector is effective.

6

Trend in physical leak

Challenge

Leak detection on the pipeline with extremely low distribution pressure

Matching

Leak detection by a combination of
- Pressure control by introducing Block Water Supply,
- Visualization of leak which mean to let leak appear on the ground.

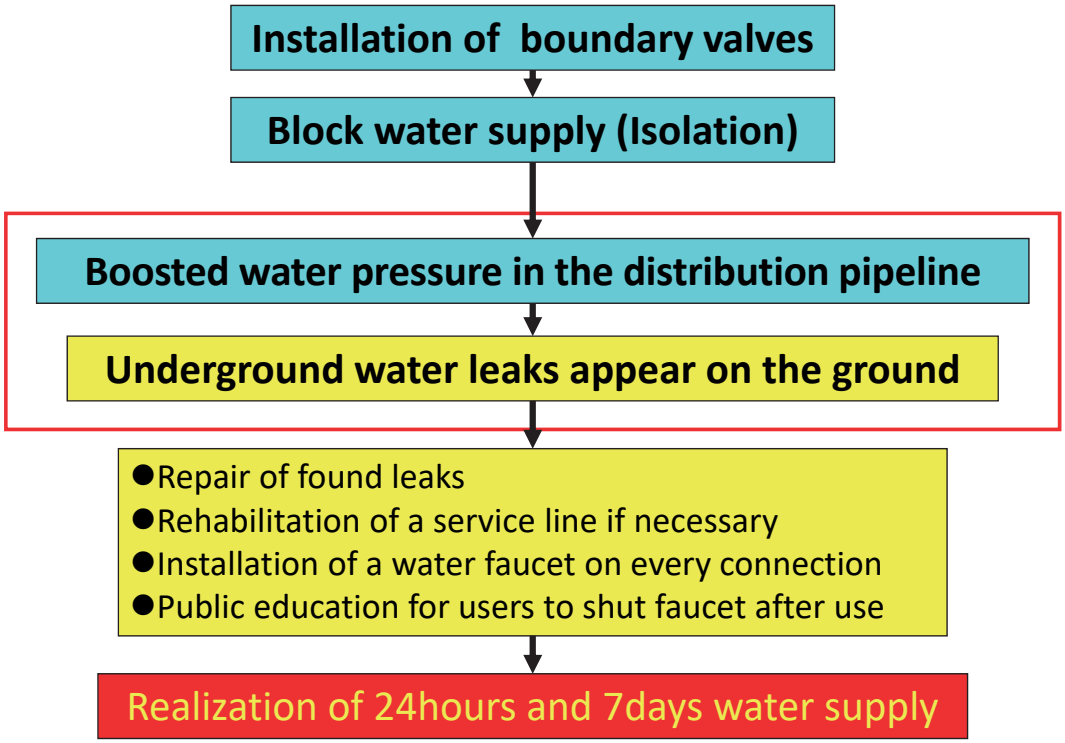
7

Outcome

1.Realization of 24hours and 7days water supply through illegal connection control

2.NRW 88 %(2018) → 50 %(2025)

Planning


Installation of boundary valves
Block water supply (Isolation)
Boosted water pressure in the distribution pipeline
Underground water leaks appear on the ground
Repair of found leaks
Rehabilitation of a service line if necessary
Installation of a water faucet on every connection
Public education for users to shut faucet after use
Realization of 24hours and 7days water supply

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Water Supply Administration
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VIET-NAM

Effective Improvement Plan on Water Supply Pipes in Vietnam

Country: VIETNAM

Name: VU THI HOAI AN

Position: Deputy Director

Division: Training Center for Water & Environment Sector

Organization: College of Urban Works Construction,
Ministry of Construction.

Japan, 2018.11.09

Training center mission:

- Training labor force in Water and Environment.
- Technical assistance to Supply, Drainage and Environment companies.
- Scientific research, technology transfer in the field of Water and Environment.
- Experimenting, testing and analyzing water quality.

Address: *The Training center has two branches:*

1st branch is loacated in Yen Thuong, Gia Lam, Ha Noi.

2nd branch is loacated in Phu Bai, Huong Thuy, Thua Thien Hue.

My duties in my organization:

- Training courses management and organization.
- Lecturer.

Content:

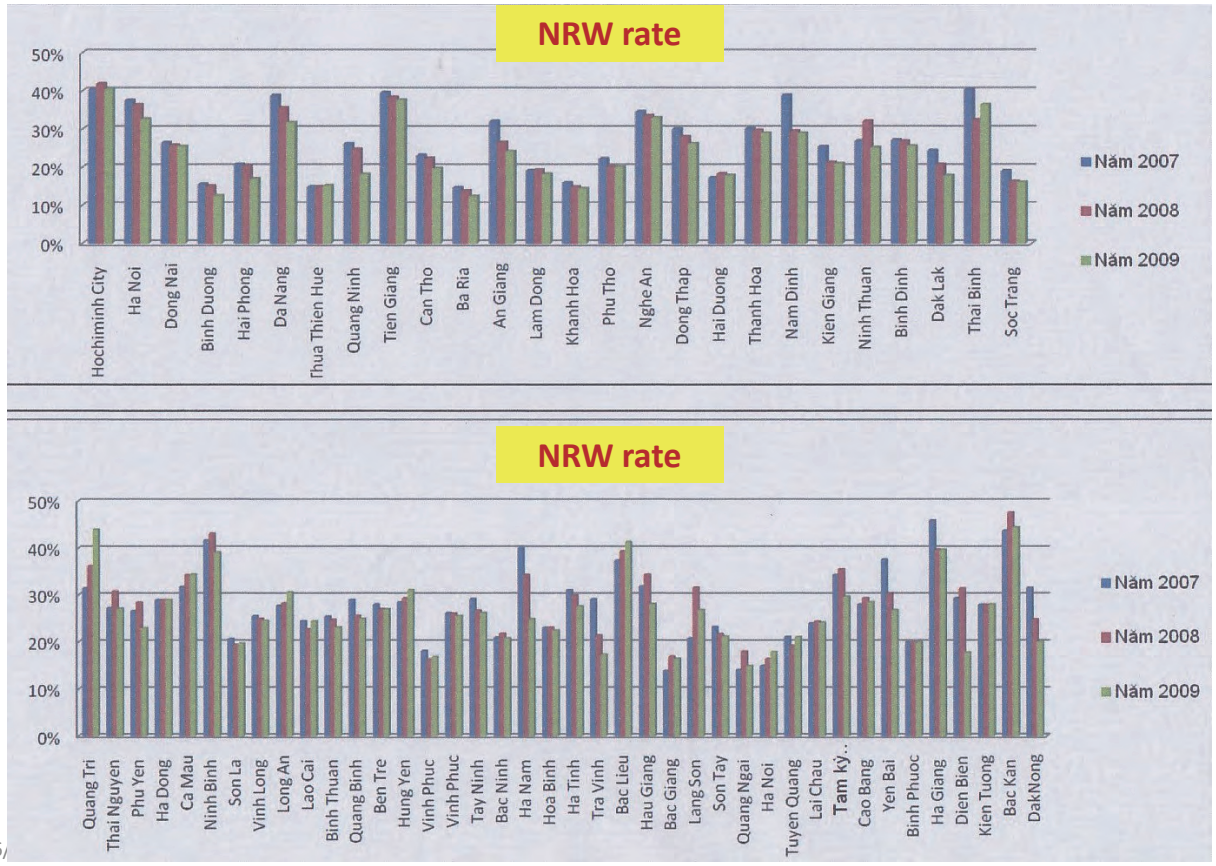
1. Major Problems
2. Activities
3. Expected Outcome

3/26/2019

Major Problems

- Leakage on the network for reasons such as network pressure, pipeline condition, traffic dynamics, leakage control policy, time and quality of repairs, etc.
- The inaccuracy of the water meter.
- 70% of the urban water supply system are provided water supply 24 hours per day; The remaining 30% is 8 - 20 h/day
- The average non – revenue water rate is 22.5%

Non Revenue Water rate in Vietnam (2007-2009)



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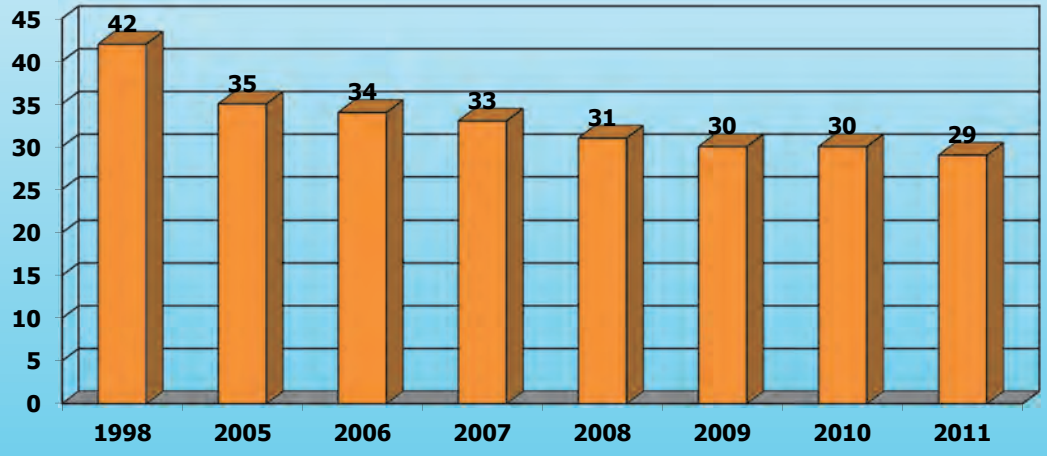
Non Revenue Water rate (%) in Vietnam



No1. Pipe cracking

No3. Joint leaking

No2. Depression street

No4. Rust inside the pipe

How to reduce NRW rate?

Activities until 2025

1. Supplementing of laws and sanctions to treat an illegal water use (by 2020)

2. Leakage monitoring (by 2025)

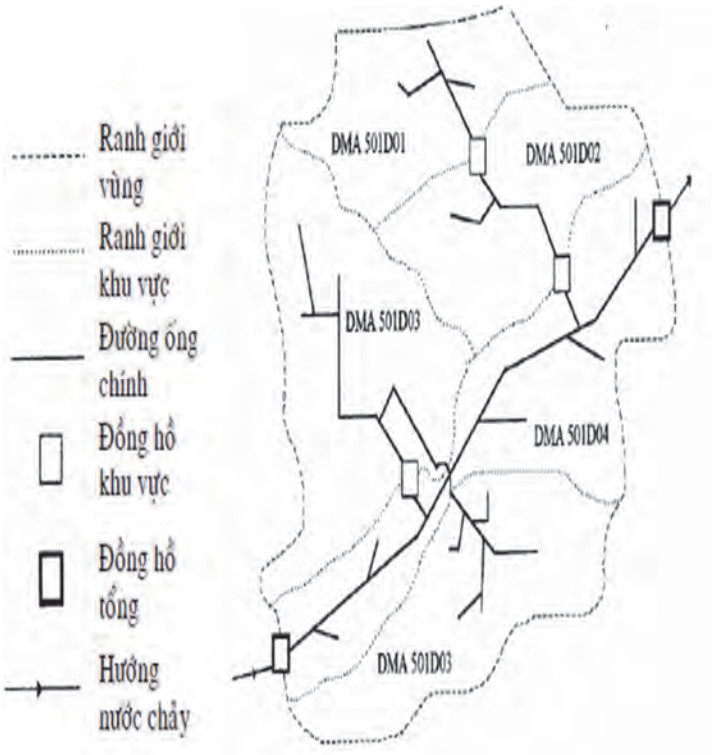
3. Network partition (DMA – District Metered Area, DMZ - District Metered Zone) (by 2020)

4. Improving the capacity of management, training of human resources (by 2025)

5. Use of equipment, application of experience / technologies such as GIS, SCADA, pressure measuring device, flow meter, turbidity meter, etc. (by 2025)

No 5. Leakage Detecting in household

No 6. Leakage Detecting on street



No 7. District Metered Area (DMA)

9

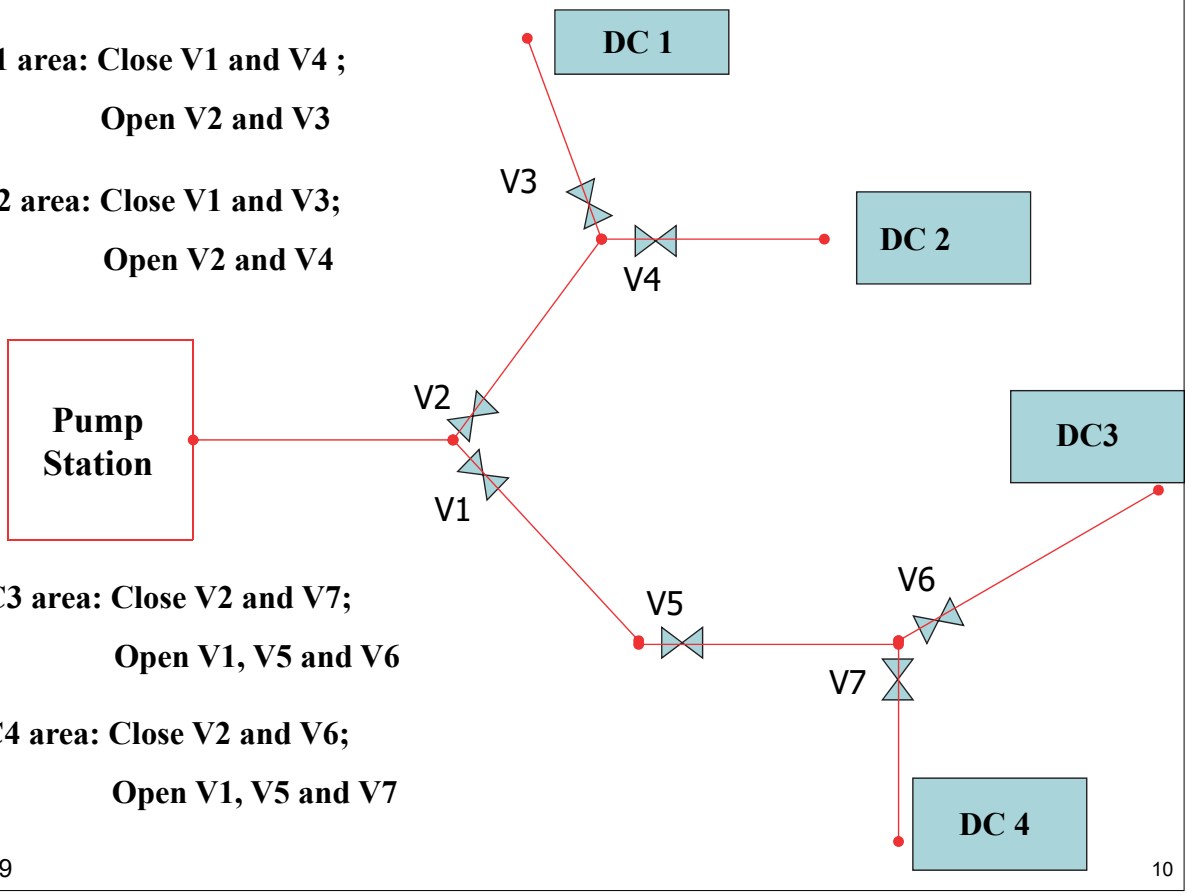
Leakage Researching Schedule:

***DC1 area: Close V1 and V4 ;**

Open V2 and V3

***DC2 area: Close V1 and V3;**

Open V2 and V4



***DC3 area: Close V2 and V7;**

Open V1, V5 and V6

***DC4 area: Close V2 and V6;**

Open V1, V5 and V7

3/26/2019

10

Expected Outcome

- NRW rate: 15 – 20%.

- 90% of the urban water supply system are provided water supply 24h/day.

- Staffs have knowledge and skills in water supply system.

Year	NRW rate	Decrease rate	Estimate result (million VND)	Estimate water price (VND)
2011	**29%**			
2015	25%	4%	*1.160*	*5000*
2020	18%	7%	*3.038*	*7000*
2025	15%	3%	*4.410*	*8500*
Sum			*8.608*	

出典：平成 ３０年度 JICA 課題別研修カントリーレポート
- 平成 30 年度 JICA 課題別研修「水道管理行政（A）」
- 平成 30 年度 JICA 集団研修「水道管理行政（B）」
- 平成 30 年度 JICA 課題別研修「薬事行政」

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http://www.jicwels.or.jp

公益社団法人国際厚生事業団（JICWELS）は、国際的な保健・福祉分野の国際協力に貢献することを目的として、1983 年（昭和 58 年）7 月 7 日に厚生省（現厚生労働省）から社団法人の認可を受け設立されました。開発途上国の行政官研修や WHO フェローの受入れ、調査企画や研究開発並びに情報の交換及び広報活動など、海外諸国との国際交流活動を推進しています。

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