

**REPUBLIC OF THE UNION OF MYANMAR
YANGON CITY DEVELOPMENT COMMITTEE (YCDC)**

**PROJECT FOR IMPROVEMENT
OF
WATER SUPPLY MANAGEMENT
OF YCDC**

**FINAL COMPLETION REPORT
(ANNEX)**

JUNE 2021

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

**TEC INTERNATIONAL CO., LTD. (TECI)
TOKYO WATER CO., LTD. (TW)**

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Remarks: The documents are stored in CD

Annex-1: Manual for Monitoring Performance Indicators (PIs)

Manual for Monitoring Performance Indicators (PIs)

Benchmarking and
Monitoring

Planning Section, EDWS, YCDC
JICA Expert Team: Atsuo Ohno

Manual for Monitoring Performance Indicators (PIs)

Benchmarking and Monitoring

Sep. 2016

Planning Section, EDWS, YCDC

JICA Expert Team: Atsuo Ohno

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1. Benchmarking and Performance Indicators (PIs)

1.1. Concept of Benchmarking

Benchmarking is a significant management tool to assess the water utility performance in the worldwide. It is normally operated by Performance Indicators (PIs).

Benchmarking enables quantitative comparison of the periodical performance of the single utility. Also, it can be compared to the performance of other utilities. Furthermore, benchmarking supports for the decision-making to improve the performance and set up the target level of future performance.

1.2. Composition of PIs data sheet

1.2.1. PIs datasheet

The composition of PIs datasheet for Engineering Department of Water and Sanitation (EDWS) YCDC is shown as below.

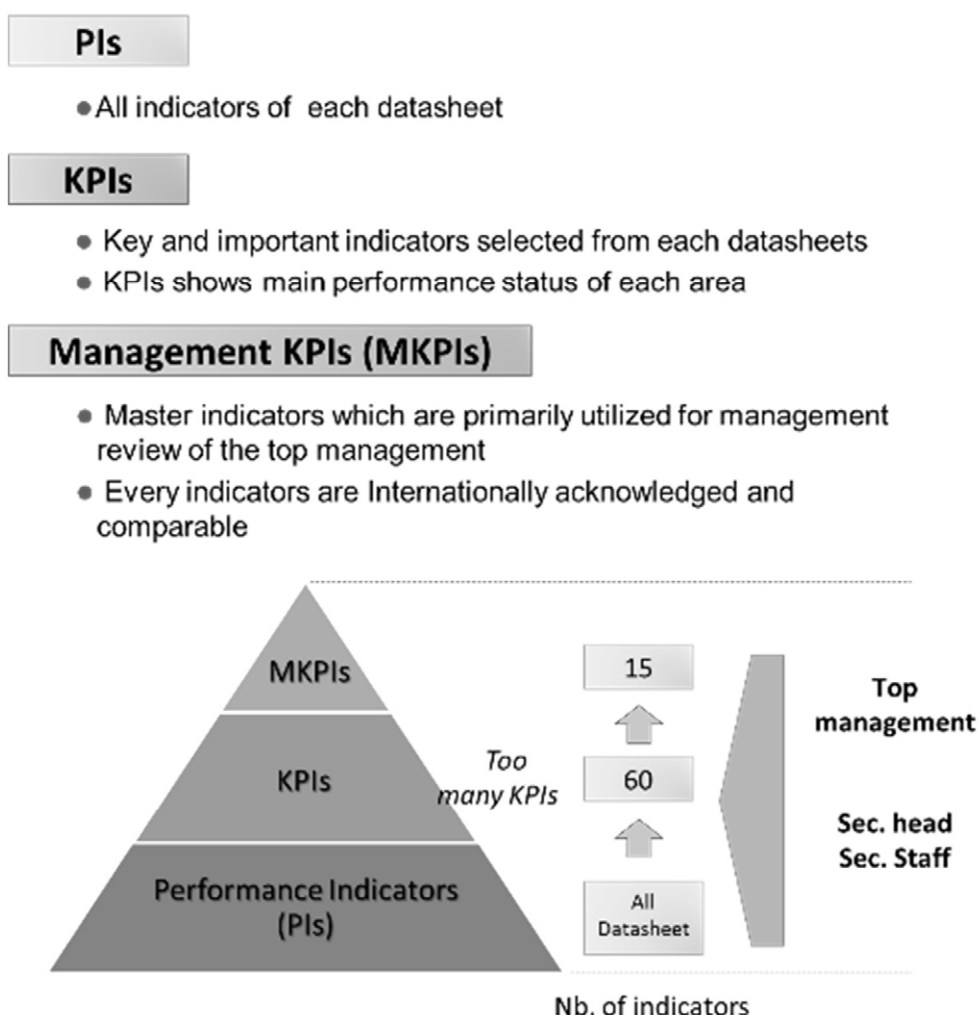
Table 1 Composition of PIs datasheet

Category	Sheet composition
1. Water supply service	• Water Supply Service
2. Production and Transmission	• Production (Reservoir, WTP, Underground)) • Water Flow Measurement • Transmission System
3. Distribution and NRW	• Distribution and NRW
4. Water Quality	• Water Quality Summary • Water Quality (Quarterly) • Water Quality (Monthly) • Water Quality (Weekly) • Water Quality (Nyaughnapin)
5. Sales	• Sales and Collection (Summary) • Sales and Collection (Data) ➤ Sub-format (billing and collection, outstanding) ➤ Sub-format (meter connection & consumption)

6. Finance	<ul style="list-style-type: none"> • Finance (Summary) • Finance
7. Admi. and HRD	<ul style="list-style-type: none"> • Administration and Human Resource • Human Resource Development (Sub-sheet)

1.2.2. Structure of PIs

There is a hierarchical structure in the PIs applied to EDWS. Out of all PIs, Key PIs (KPIs) and Management KPIs (MKPIs) are selected. Top management shall always focus on all MKPIs and some KPIs. Sec. head and staffs in charge shall carefully monitor the relevant KPIs and PIs.



2. Management KPIs (MKPIs)

Fifteen (15) Management KPIs (MKPIs) was selected from overall indicators and set up. MKPIs are shown as follows.

Table 2 Management KPIs

Sq/N	Symbol	Indicators	Unit
1. Water Supply Service			
1	S1	Service population	'000 inhabitants
2	S2	Total connections	Nb.
3	S28	Service coverage rate	%
		Service coverage rate	%
2. Production & Transmission			
4	PT4-4	Daily average total production	m ³ /day
3. Distribution & NRW			
5	D17	NRW ratio	%
6	D23	The number of repaired pipe breaks per pipe length	Repaired Nb./km/year
4. Water Quality			
7	Q7-1-1	Compliance ratio of monthly water test in water facilities -treated water- (turbidity)	%
8	Q7-5-2	Compliance ratio of monthly water test at tap water in TS (Residual chlorine)	%
5. Sales & Collection			
9	C15-3	Operating metering ratio (by total connection)	%
10	C20-2	Collection ratio in amount	%
6. Finance			
11	F5	Operating ratio (Operating cost coverage)	%
12	F9	Average revenue per m ³ sold	Kyat/m ³ water sold
13	F12	Unit operational cost for water sold	Kyat/m ³ water sold
7. Administration & Human Resource			
14	H8	Training period*number of trainee/Total staff	Person*day
15	H11	Total staffs number/1000 connections	person/ 000 conn.

The definition, formula, explanation on MKPIs are shown as follows.

MKPI 1: Service Population

S1	Service population	1000 inhabitants	-
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Service pop in the responsible area was not available, so that this indicator value is estimated as follows.

Definition:	Residential population with access to water services in the area of YCDC's responsibility
Estimation:	Number of Household with water services X Average number of persons per household

MKPI 2: Total Connection

S2	Total connection	connections	-
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Definition:	Total number of connection which includes all kind of customer type such as domestic, commercial, departmental, FOC etc.
Data source:	From "Connection and Consumption Sub-sheet" as a part of "Sales sheet"

MKPI 3: Service Coverage Ratio

D14	Service coverage ratio (population)	%	IBNET 2.1
D15	Service coverage ratio (household)		

Definition:	Residential population with access to water services as a percentage of total residential population (household) in the area of YCDC's responsibility
Description:	This indicator represents how many residential population (household) of the service area actually receives water supply by the utility.

D 14	Service population (D1-2)
	Total population (D1-1)
D15	Nb. of household connected (D1-4)
	Nb. of household (D1-3)

MKPI 4: Daily average total production

PT4-4	Daily average total production	m ³ /day	-
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Definition:	Daily average total production of water
Description:	<p>This indicator represents total daily average total production of water.</p> <p>(untreated)</p> <ul style="list-style-type: none"> - Gyobyu reservoir - Phugyi reservoir (aqueduct) - Hlawga No.1 (pump station) - Hlawga No.2 (gravity) - Underground <p>(treated)</p> <ul style="list-style-type: none"> - Nyaughnapin WTP Phase 1 - Nyaughnapin WTP Phase 2 <p>Better to use Transmission and Distribution flow volume</p>

MKPI 5: NRW ratio

D17	NRW ratio	%	IBNTE 6.1
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- Formula will be entered after getting the relevant data

Definition:	<p>Non-revenue water (NRW) represents the difference between the volume of water delivered into a network and billed authorized consumption.</p> <p>NRW sec. will calculate the ratio every month</p>
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MKPI 6: Nb. of Repaired Pipe Break – Pipe Length

D23	The number of repaired pipe breaks on network per pipe length	Nb./ km	IBNET 9.1
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Definition:	Repaired pipe breaks on pipeline network expressed per km of the total pipeline network
Description:	This indicator represents how many pipe breaks are repaired in the networks per km.
	$\frac{\text{Number of pipe break identified (distribution) (D3-4)}}{\text{Length of distribution pipeline (end of month)(D2-2)}}$

MKPI 7&8: Compliance ratio of monthly water test

Q7	Compliance ratio of monthly water test	%	IBNET 15.4 (chlorine)
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Definition:	The percentage of monthly samples tested for each parameter that pass the relevant standards
Description:	This indicator represents how much percentage of monthly samples actually pass the water quality standards in each parameter
	<p>[4.Water Quality 3 (Monthly)] Sheet</p> $\frac{\text{Number of tests of treated water that passed the relevant standard (QM3)}}{\text{Total sampling numbers tested (QM2)}}$

Formula:	(e.g.) in January	
1	Turbidity - Total	=H118/H112
1.	Water facilities (Reservoir, WTP, SR and PS)	=H115/H109
2.	Tap water in TS	=H116/H110
3.	Tube well	H117/H111
2.	E.coli	=H119/H110
3.	Total coliform	=H120/H110
4.	Electrical conductivity	=H121/H112
5.	Total dissolved solids	=H122/H112
6.	Residual chlorine	=H123/H112

MKPI 9: Operating Metering Ratio

C15-3	Operating metering ratio (by total connection)	%	IBNET 7.1
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Definition:	Number of connection with operational meter as a percentage of number of total metered connections
Description:	This indicator represents how much percentage of total connection has functional and accurately operational water meters.
Formula:	$\frac{\text{Number of water meter operated (D4-2)}}{\text{Number of total meter(Metered+Flat+Others) (end of the month) (D4-1)}}$

MKPI 10: Collection Ratio - amount

C17-2	Collection ratio in amount	%	IBNET 23.2
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Definition:	Collection amount from customer as a percentage of billed amount
Description:	This indicator represents how much water charge is actually collected in the percentage of total billed amount.
Formula:	$\frac{\text{Amount of bills collected (Metered+Flat+Others) (C8-4)}}{\text{Amount of bills delivered (Metered+Flat+Others) (C6-4)}}$

MKPI 11: Operating ratio

F6	Operating ratio (Operating cost coverage)	%	IBNET 24.1
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Definition:	Daily average production of treated water
Description:	This indicator represents how much operating revenue for water service covers operating expenses for water service. It evaluates the profitability of water service. If the ratio exceeds 1.0, it means that operating costs are covered by operating revenue. Thus, the profits are generated.
	$\frac{\text{Total operating revenues for water (F1)}}{\text{Total operating expenses for water (F2)}}$

MKPI 12: Average revenue per m³ sold

F9	Average revenue per m ³ sold	Kyat/m ³ water sold	IBNET 18.3
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Definition:	Average annual operating revenue expressed by annual amount of water sold per m ³
Description:	This indicator represents how much operating revenue is generated per sold water as m ³ .
	$\frac{\text{Total operating revenues for water (F1-9)}}{[\text{5. Sales \& Collection (Data)] Sheet Metered consumption (C11)}}$

MKPI 13: Unit operational cost for water sold

F12	Unit operational cost for water sold	Kyat/m ³ water sold	IBNET 11.3
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Definition:	Average annual operating expenses expressed by water sold volume as m ³
Description:	This indicator represents how much operating expenses are costed per m ³ of water sold volume.

Total operating expenses for water (F2-9)
[5. Sales & Collection (Data)] Sheet Metered consumption (C11-9)+

MKPI 14: Training period*number of trainee/Total staff

H8	Training period*number of trainee/Total staff	Person-day	-
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Description:	This indicator represents to how much training opportunities are given to per 1 staff
	$\frac{\text{Training period} \times \text{No. trainees (WSD) (H7)}}{\text{No. of staff of WSD (H2)}}$

MKPI 15: Total staffs number/1000 connections

H11	Total staff number/1000 connections	Person /conn./ '000	IBNET 12.1
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Description:	This indicator represents how much percentage is shared by practical sessions in the total sessions
	$\frac{\text{No. of staff of WSD (H2)}}{\text{Number of total connections (Metered+Flat+Others) (end of the month) (C4-5-8)}} \times 1000$

3. Other KPIs (MKPIs)

Some important KPIs are picked up and explained as follows.

3.1. Reservoir

Daily average total production (untreated)

PT4-1	Daily average total production (untreated)	m ³ /day
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Definition:	Daily average production of untreated water
Description:	This indicator represents total daily average production of untreated water. Untreated water can be recognized as: (As of Mar. 2020) <ul style="list-style-type: none"> - Gyobyu reservoir - Phugyi reservoir (aqueduct) - Hlawga No.1 (pump station) - Hlawga No.2 (gravity) - Underground

Daily average total production (treated)

PT4-2	Daily average total production (treated)	m ³ /day
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Definition:	Daily average production of treated water
Description:	This indicator represents total daily average production of treated water. Treated water can be recognized as: (As of Mar. 2020) <ul style="list-style-type: none"> Nyaughnapin WTP Phase 1 Nyaughnapin WTP Phase 2

Percentage of actual production (surface water)

PT4-5	Percentage of actual production (surface water)	%
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Definition:	Total production of surface water as a percentage of total water production
Description:	This indicator represents how much percentage of total water production is shared by surface water production
Formula:	$\frac{\text{Surface production volume (Gyobyu reservoir, Phugyi reservoir, Hlawga No.1 (pump station), Hlawga No.2 (gravity), Nyaughnapin WTP Phase 1, Phase 2)(PT2-1\sim 2-2, PT2-5\sim 2-8)}}{\text{Actual Production Volume total (PT2-1\sim 2-2, PT2-5\sim 2-9)}}$

Achievement ratio of water production of the planned production

PT4-6	Achievement ratio of water production of the planned production	%
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Definition:	Total production of surface water as a percentage of total water production
Description:	This indicator represents how much percentage of designed production is achieved by actual water production.
Formula:	$\frac{\text{Actual water production total (PT2-1\sim 2-2, PT2-5\sim 2-9)}}{\text{Design production capacity (PT1-7)}}$

Nyaughnapin WTP - Achievement ratio of WTP water production of the planned production

P4-1	Achievement ratio of WTP water production of the planned production	%
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Definition:	Actual production volume of water as a percentage of design water production
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Description:	This indicator represents how much percentage of designed production is achieved by actual water production.
Formula:	$\frac{\text{Daily average water production volume (estimated) (P2-1-9)}}{\text{Design production capacity (P2-1-1)}}$

Nyaughnapin WTP – Production efficiency (produced water / raw water)

P4-2	Production efficiency (produced water / raw water)	%
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Definition:	Outflow production volume of water as a percentage of inflow water volume of raw water
Description:	This indicator represents how efficiently water is produced from raw water
Formula:	$\frac{\text{Monthly water production volume (estimated) (P2-1-8)}}{\text{Monthly raw water volume (estimated) (P2-1-6)}}$

Nyaughnapin WTP – Transmission efficiency (transmitted water / produced water)

P4-3	Transmission efficiency (transmitted water / produced water)	%
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Definition:	Outflow transmitted water volume as a percentage of inflow water volume of raw water
Description:	This indicator represents how efficiently production water is transmitted from production water
Formula:	<p>[2. Transmission System] Sheet</p> $\frac{\text{Monthly flow volume (Outlet total)(T1-1-8) + (Monthly flow volume (Outlet total)(T1-2-8))}}{\text{Monthly water production volume (metered/estimated)}}$

(P2-1-8)

Nyaughnapin WTP – Overall production-transmission efficiency (transmitted water / raw water volume)

P4-4	Overall production-transmission efficiency (transmitted water / raw water volume)	%
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Definition:	Actual transmitted volume of water as a percentage of raw water volume per month
Description:	This indicator represents how efficiently water is produced and transmitted between inflow volume and outlet volume
Formula:	<p style="text-align: center;">[2. Transmission System]</p> $\frac{\text{Monthly flow volume (Outlet total)(T1-1-8) + (Monthly flow volume (Outlet total)(T1-2-8))}{\text{Monthly raw water volume (metered/estimated) (P2-1-6)}}$

Nyaughnapin WTP – Power consumption for production

P4-5	Power consumption for production	Kwh/m ³
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Definition:	Power consumption volume for producing water per m ³
Description:	This indicator represents how much volume of electricity power is consumed in the production of water expressed as per m ³
Formula:	$\frac{\text{Power consumption for production (P2-1-13)}}{\text{Monthly water production volume (estimated) (P2-1-8)}}$

Nyaughnapin WTP –Chlorine consumption per unit treated water volume (m³)

P4-7	Chlorine consumption per unit treated water volume (m ³)	g/m ³
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Definition:	Chlorine consumption volume for producing water per m ³
Description:	This indicator represents how much volume of Chlorine is consumed in the production of water expressed as per m ³
$\frac{\text{Chlorine consumption (P2-1-16) x 1000}}{\text{Monthly water production volume (estimated) (P2-1-8)}}$	

3.2. Distribution and NRW

Old pipe ratio

D7	Percentage of old pipe in distribution network	%
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Definition:	Old pipe length more than 40 years in distribution network as a percentage of total distribution network length
Description:	This indicator represents how much percentage of total distribution networks is shared by old pipe of more than 40 years.
$\frac{\text{Length of old distribution network (D2-4)}}{\text{Length of distribution network (end of month)(D2-2)}}$	

Pipe breaks ratio

D11	Pipe breaks on network per pipe length	breaks/km/month
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Definition:	Total number of pipe breaks expressed per km of the water network in the month
Description:	This indicator represents how many pipe breaks are happened on the networks per km.
$\text{Number of pipe breaks reported (total network)(D3-6)}$	

Length of total pipeline (end of month)(D2-3)
Formula: =H27/H14

Nb. of Repaired Pipe Break – Connection

D14	The number of repaired pipe breaks per 1,000 connections	Nb./ 1,000 conn.
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Definition:	Repaired pipe breaks on pipeline network expressed per 1000 connections
Description:	This indicator represents how many pipe breaks are happened on the network per 1000 connection.
Formula	$\frac{\text{Number of pipe break repaired (D3-5)}}{\text{Number of total connections (Metered+Flat+Others) (end of the month)(C4-5-8)}}$

Ratio of pipe breaks repaired

D15	Ratio of pipe breaks repaired	%
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Definition:	Repaired pipe breaks on pipeline network as a percentage of total pipe breaks reported
Description:	This indicator represents how much percentage of the reported pipe breaks in the pipeline network is actually repaired.
Formula:	$\frac{\text{Number of pipe break repaired (D3-5)}}{\text{Number of pipe break reported (D3-6)}}$

Continuous Supply

D16	Customers with continuous supply	%
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Definition:	Customers with continuous water supply of 24hx7 as a percentage of total connections
Description:	This indicator represents how much percentage of total customers receive continuous water supply from the utility. Continuous water supply means water supply for 24 hours everyday.
$\frac{\text{Customers with continuous supply (D5-2)}}{\text{Number of total connections (Metered+Flat+Others) (end of the month) (C4-5-8)}}$	

3.3. Water Quality Monitoring

Percentage of parameters analyzed on the standard

Q4	% of parameters analyzed on the standard	%
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Definition:	The percentage of parameters tested against number of parameter required by MDWQ standards
Description:	This indicator represents how much percentage of total parameters required by MDWQ standards are actually tested in Laboratory
Formula;	$\frac{\text{Number of parameters actually tested in lab (Q1-2)}}{\text{Number of parameters required by the MDWQ standard (Q1-1)}}$

Implementation ratio of monthly water analysis by type of sampling

Q5-3	% of actual samplings of required sample numbers (monthly)	%
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Definition:	The percentage of monthly samples collected against required sample numbers
Description:	This indicator represents how much percentage actually the utility collect monthly samples against required monthly sample numbers
$\frac{\text{Total number of actual samples (Q3-1-4)}}{\text{Total number of samples required (locations) (Q3-1-3)}}$	

Implementation ratio of monthly water analysis by type of sampling

Q5-4	% of actual tests of sampling numbers (monthly)	%
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Definition:	The percentage of monthly samples tested against collected monthly sample numbers by sampling types
Description:	This indicator represents how much percentage actually the utility test monthly samples out of total monthly sample numbers by sampling types
$\frac{\text{Monthly numbers of actual monthly test (per month) (Q3-2-4)}}{\text{Total number of actual samples (Q3-1-4)}}$	

Compliance ratio on water quality standard in clear water

QW8	Compliance ratio on WTP target value	%
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Definition:	The percentage of samples tested for each parameter that pass the WTP target value
Description:	This indicator represents how much percentage of total samples actually pass the WTP target value in each parameter
$\frac{\text{Number of tests of treated water that comply with the standards (QW3-2-5, 3-3-5, 3-4-5)}}{\text{Total number of samples tested for each parameter}}$	

Number of tests of treated water
 (QW3-2-1, 3-3-1, 3-4-1)

3.4. Sales and Collection

Metering Ratio – by Connection

C-15-1	Metering ratio (by total connection)	%
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Definition: Number of metered connection as a percentage of number of total metered connections

Description: This indicator represents how much percentage of total connection is metered connection.

$$\frac{\text{Number of connections -Metered (end of the month) (C4-1-X)}}{\text{Number of total connections (Metered+Flat+other) (end of the month) (C4-5-X)}}$$

Input the relevant cell number of sub-items in "X"

Billing Ratio - number

C16	Billing ratio in number	%
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Definition: Connections with bill delivered as a percentage of total connections

Description: This indicator represents how much percentage of the total connections the utility actually deliver water bills to customers.

$$\frac{\text{Number of total bills delivered (Metered+Flat+Others) (C5-4-X)}}{\text{Number of total connections (Metered+Flat+Others) (end of the month) (C4-5-X)}}$$

Collection Ratio - number

C17-1	Collection ratio in number	%
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Definition:	Connections with water charge collection as a percentage of total connections of bill delivered
Description:	This indicator represents how much percentage of total connections the utility actually collect water charges from customers.
Formula:	$\frac{\text{Number of bills collected (Metered+Flat+Others) (C7-4-X)}}{\text{Number of bills delivered (Metered+Flat+Others) (C5-4-X)}}$

Outstanding Ratio - number

C18-1	Outstanding ratio in number	%
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Definition:	Connections with bill outstanding as a percentage of total connections of bill delivered
Description:	This indicator represents how much percentage of total connections does not pay water charges.
Formula:	$\frac{\text{Number of bills outstanding (Metered+Flat+Others)(C9-4-X)}}{\text{Number of bills delivered (Metered+Flat)(C5-4-X)}}$

Outstanding Ratio - amount

C18-2	Outstanding ratio in amount	%
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Definition:	Amount of bill outstanding as a percentage of total amount of bill delivered
Description:	This indicator represents how much amount becomes actual outstanding in the percentage of total billed amount.

Formula:	$\frac{\text{Amount of bills outstanding (Metered+Flat+Others) (C10-4-X)}}{\text{Amount of bills delivered (Metered+Flat+Others) (C6-4-X)}}$
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Monthly Consumption Ratio

C19-1	Monthly water consumption (metered)	m ³ /month
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Definition:	Monthly water consumption of metered customers
Description:	This indicator represents how much volume of water is consumed by metered customers. = Metered consumption (C11-X)

Daily Consumption Ratio – m³

C19-2	Daily average water consumption (metered)	m ³ /d (MGD)
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Definition:	Daily water consumption of metered customer expressed per m ³
Description:	This indicator represents the daily average volume of water consumption per m ³ by metered customers. $\frac{\text{Metered consumption (C11-X)}}{\text{Number of assessment days of month}^{*1}}$

*1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	29	31	30	31	30	31	31	30	31	30	31

Daily Consumption Ratio - litter

C20	Daily water consumption per connection	L/conn/d
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Definition:	Daily water consumption expressed per litter per connection
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Description:	This indicator represents the daily average volume of water consumption per litter per connection by metered customers.
Formula:	$\frac{\text{Metered consumption (C11-X)} \times 1000}{\text{Number of connections -Metered (end of the month) (C4-1-X)} \times \text{(assessment days)}}$

Tariff Revenue Ratio – total connection

C21-1	Average tariff revenue per connection (total connection)	Kyat/conn
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Definition:	Amount of tariff revenue collected as a percentage of total number of connections
Description:	This indicator represents the average tariff revenue amount per connection.
Formula:	$\frac{\text{Amount of bills collected (Metered+Flat+Others) (C8-4-X)}}{\text{Number of total connections (Metered+Flat+Others) (end of the month) (C4-5-X)}}$

Collection Period

C23	Collection period of account receivable (Outstanding bill amount)	days
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Definition:	Amount of bills outstanding as a percentage of total amount of bill delivered during the assessment days, to check collection efficiency
Description:	<p>This indicator represents the average number of days between the date billed is made and the date payment is received from.</p> <p>It shows the effectiveness of the collection process by the amount of outstanding revenue.</p>
Formula:	$\frac{\text{Amount of bills outstanding (Metered+Flat)(C10-4-9)}}{\text{x Assessment days}}$

Amount of bills delivered (Metered+Flat+others)(C6-4-7)	
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3.5. Finance

Financial balance

F5	Financial balance	Kyat/month
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Definition:	Total financial balance between operating revenue of water and operating expenses of water
Description:	This indicator represents how much amount of benefits (or deficits) is generated between operating revenue and operating expenses. This indicator could be evaluated at the end of the fiscal year.
Formula:	$\frac{\text{Total operating revenues for water (F1-9)} - \text{Total operational expenses for water (F2-9)}}{\text{Total operating revenues for water (F1-9)}}$

Composition of operating revenue

F7	Composition of operating revenue	%
----	----------------------------------	---

Definition:	Composition of current operating revenue of water
Description:	This indicator represents how much percentage each revenue item shares in the total operating revenue respectively.
Formula:	(e.g.) in January Departmental Water Charges: =H9/H17 Public Water Charges: =H10/H17 Water Connection: =H11/H17 Sales of Water meters: =H12/H17 Rental of Shops and Sites: =H13/H17

Plumber Licenses Fees: =H14/H17 Road Crossing Charges: =H15/H17 Other Revenue: =H16/H17

Composition of operating expenses

F8	Composition of operating expenses	%
----	-----------------------------------	---

Definition:	Composition of current operating expenses of water
Description:	This indicator represents how much percentage each cost item shares in the total operating expenses respectively.
Formula:	(e.g.) in January Salary: =H19/H27 Labour Charges: =H20/H27 Electricity: =H21/H27 Petrol&Lunricant: =H22/H27 Operating Material: =H23/H27 Printing & Publishing : =H24/H27 Materials, repair, maintenance and spare prt: =H25/H27 Other expenses: =H26/H27

Average revenue per m3 produced

F9	Average revenue per m3 produced	Kyat/m3 water produced
----	---------------------------------	------------------------------

Definition:	Average annual operating revenue expressed by annual amount of water produced per m3
Description:	This indicator represents how much operating revenue is generated per produced water volume as m3.
	Total operating revenues for water (F1-9)
	<hr style="width: 50%; margin: auto;"/> [2. Transmission Flow Measurement] sheet

Actual production volume (PT2) – 1, 2, 5, 6, 7, 8, 9

Unit operational cost for water produced

F12	Unit operational cost for water produced	Kyat/m3 water produced
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Definition:	Average annual operating expenses expressed by water production volume as m3
Description:	This indicator represents how much operating expenses are costed per m3 of water production volume.
Formula:	$\frac{\text{Total operating expenses for water (F2-9)}}{\text{Actual production volume (PT2) – 1, 2, 5, 6, 7, 8, 9}}$
[2. Transmission Flow Measurement] sheet Actual production volume (PT2) – 1, 2, 5, 6, 7, 8, 9	

3.6. Administration and HRD

Training courses (by Admin Dep)

Training opportunities	Person-day
------------------------	------------

Description:	This indicator represents how much training opportunities are actually given to the staff members. This indicator is expressed as person-day.
Formula:	=Training duration (day) x No. of trainees (WSD)

Training courses (by WSD)

Training opportunities	Person-day
------------------------	------------

Description:	This indicator represents how much training opportunities are given to the staff members. This indicator is expressed as person-day.
--------------	--

Formula	=Training duration (day) x No. of trainees (WSD)
---------	--

Ratio of trained staff in a year

H5	Ratio of Trained staff in a year	%
-----------	----------------------------------	---

Description: This indicator represents to how much percentage of total staff of WSD is trained in a year.

No. of trained staff by WSD in a year (H3)

No. of staff of WSD (H2)

Ratio of trained technicians in a year

H6	Ratio of Trained staff in a year	%
-----------	----------------------------------	---

Description: This indicator represents to how much percentage of total technicians of WSD is trained in a year.

Formula: No. of trained technicians in a year (H3-4)

No. of technicians (H2-2)

Ratio of trainers to trainees

H9	Ratio of trainers to trainees	Person
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Description: This indicator represents how many trainers exist per 1 trainee

Formula: Number of trainers

Number of trainees

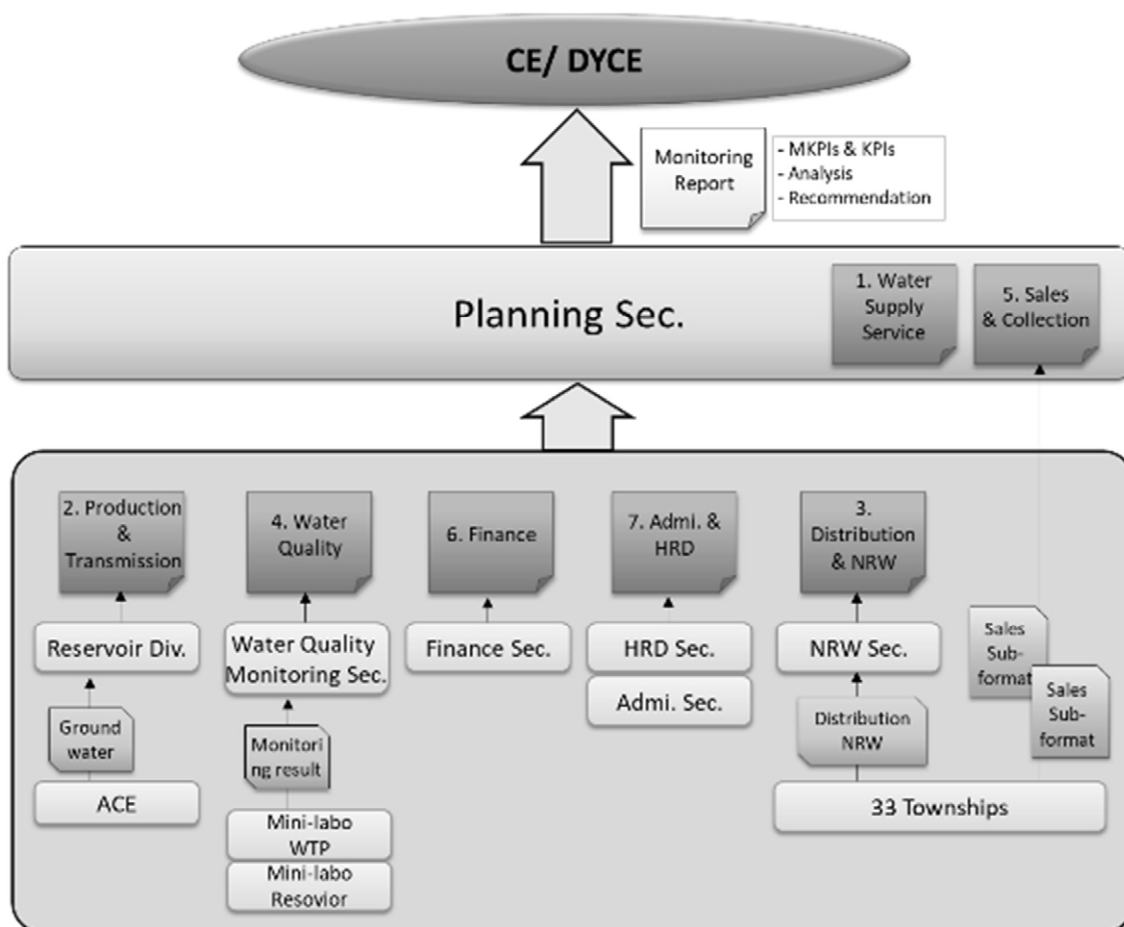
4. Monitoring System of PIs Data

4.1. PIs Data Collection Flow

Current PIs data collection flow is shown as follows. This flow should be revised as necessary and flexibly changed according to the institutional structure of EDWS.

Category of Datasheet	Responsible Section for Preparation of Datasheet		Submission to	Symbol
	Original Section Responsible	Intermediate Section		
1. Water Supply Service	(Proposed Planning & Monitoring Section) (Proposed Commercial Section)	None	Planning	S
2. Production & Transmission	Reservoir Division (Proposed Water Distribution Management Section)	None	Planning	P T
Groundwater	ACE (Ms. Aye Pa Pa Nyo)	None	Planning	
3. Distribution & NRW	T/S	NRW Sec.	Planning	D
4. Water Quality	Water Quality Monitoring Section Nyaghnapi WTP, Reservoirs	Water Quality Monitoring Sec.	Planning	Q
5. Sales & Collection			Planning	C
Sub-format	T/S	None	Planning	
Meter conn. & Consumption	T/S	None	Planning	
6. Finance	Finance Section	None	Planning	F
7. Administration & Human Resource	Administration Section	None	Planning	H

Data collection flow is shown in the following figure.



4.2. Reporting

After collection of PIs datasheet, it is arranged and compiled by the planning section. Planning section prepare a monitoring report including analysis and suggestion by summarizing the performance indicated PIs. The report shall be monthly or quarterly submitted to the top management such as CE/ DYCE/ ACE. In addition, Planning section prepare an annual report by compiling monthly or quarterly reports.

5. Analysis of PIs Data

5.1. Key Points for Analysis

To make an analysis of the collect PIs data, the followings could be the starting steps.

Key point

- 👉 Comparing periodical performance
- 👉 Comparing regional performance (by township, by district)
- 👉 Checking outstanding trends (positive, negative)
- 👉 Identifying its main reasons/causes related to outstanding trends
- 👉 Finding the challenge and the necessity of improvement

5.2. Findings from the Performance in FY2018/19

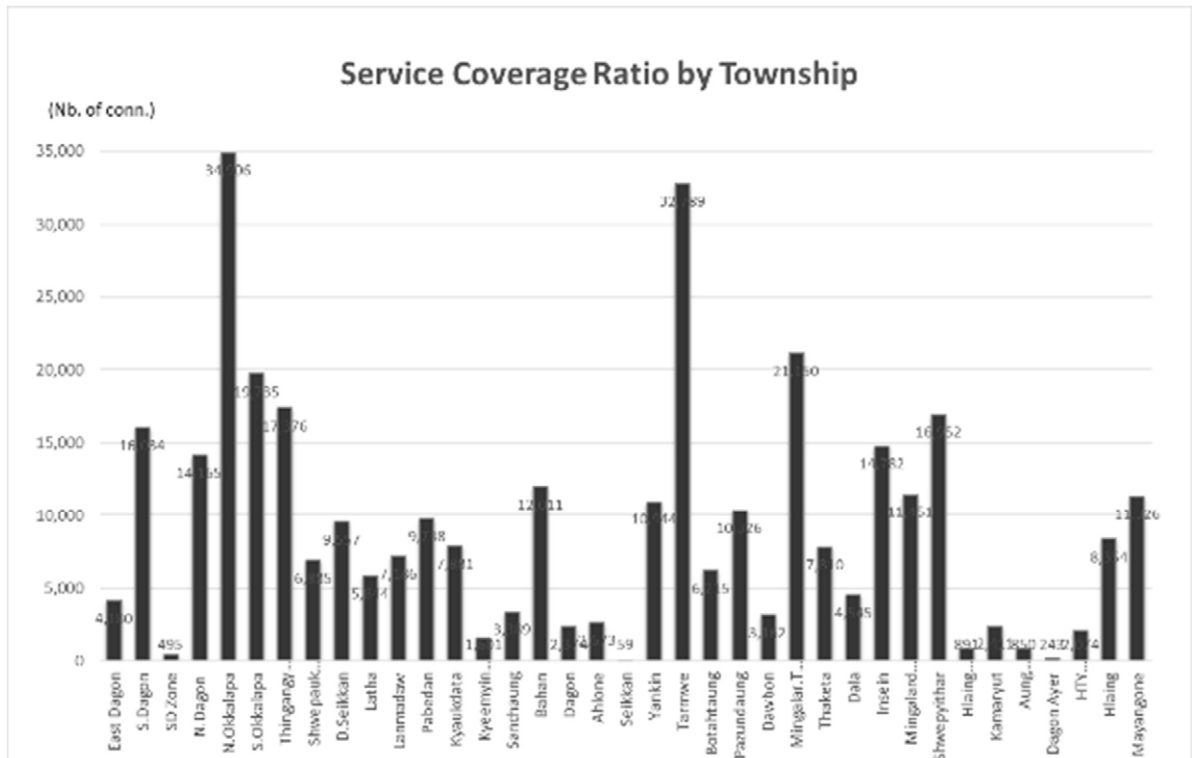
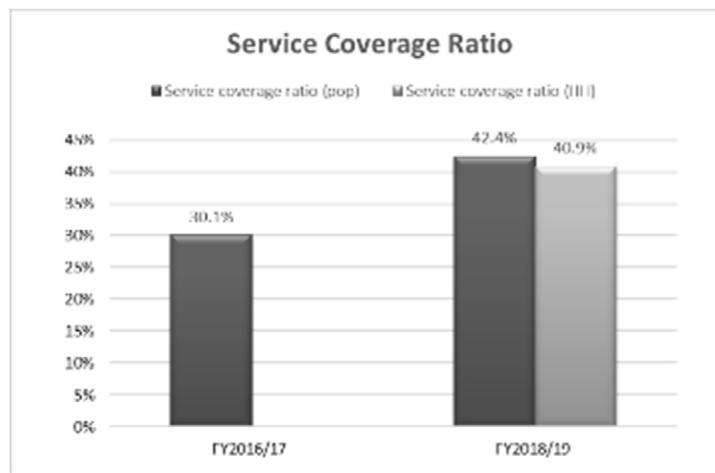
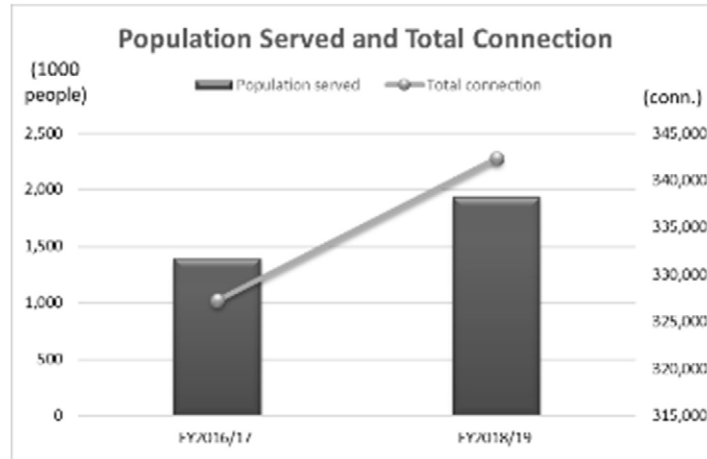
5.2.1. Management KPIs

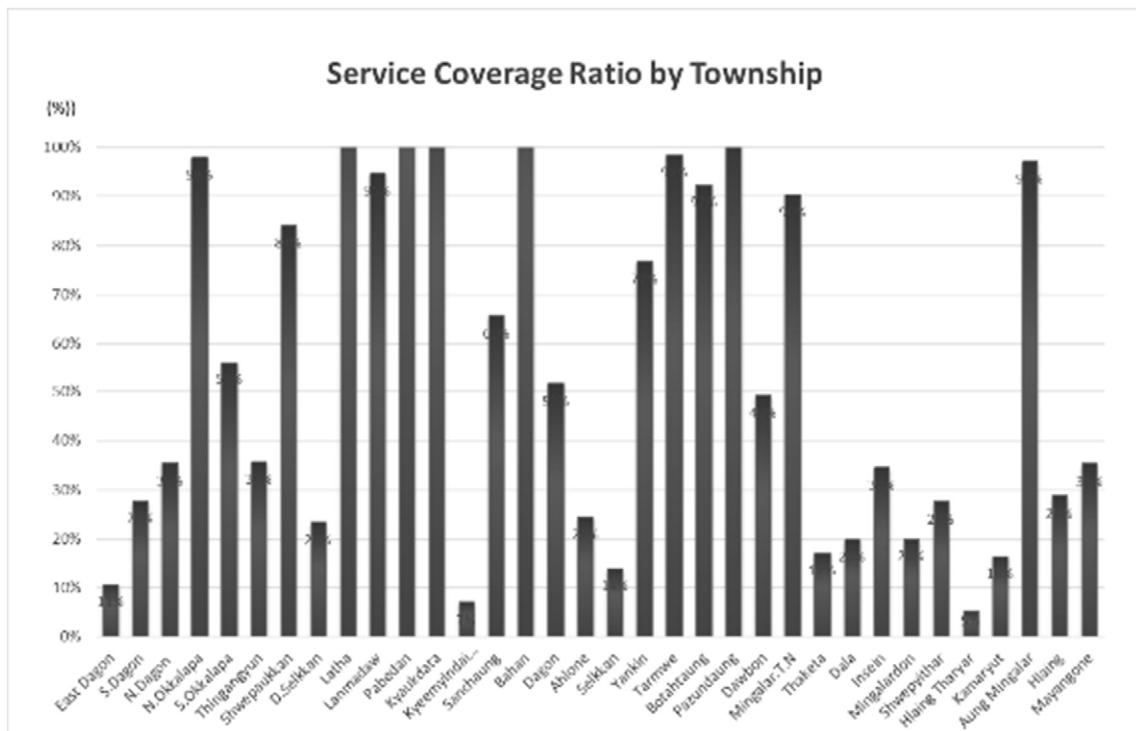
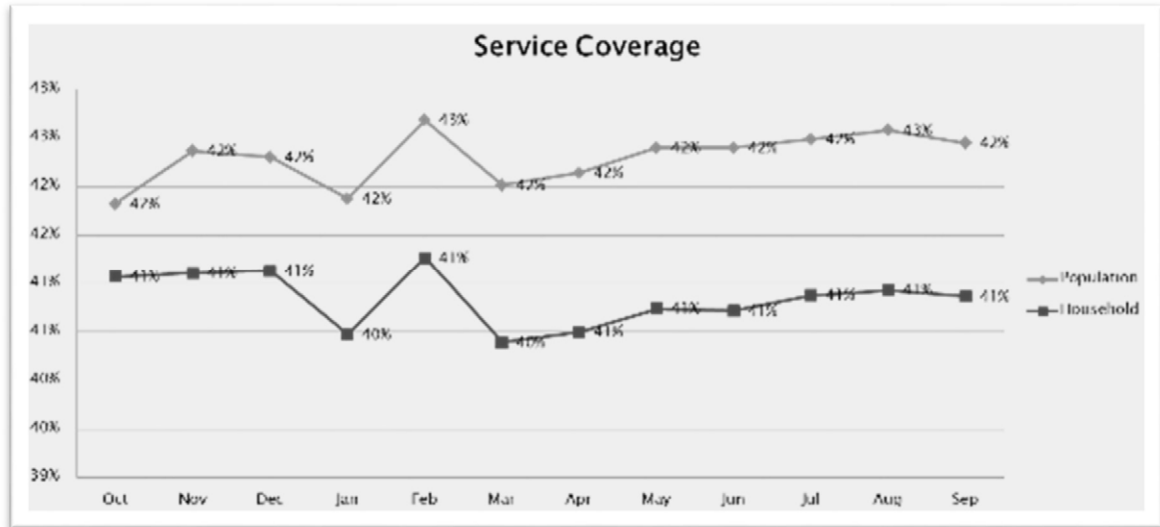
(1) Number of Connection and Service Coverage

The number of connection shows an increase trend during three years from 327,285 connections in FY2016/17 to 342,364 connections in FY2018/19. Served population also increased from 1,391,626 to 1,928,093. Approximately 536,000 connection has been connected to the water system of EDWS.

As the results, water service coverage of EDWS increase from 30% in FY2016/17 to 42% in FY2018/19.

It needs an attention on the estimation method has been changed in FY2018/19. Served population is estimated by multiplying number of households (HH) by average number of persons per HH. In the estimation of FY2016/17, we utilized a uniform average value of 5 persons/HH for all township as a simple method. In FY2018/19, the average number of persons/HH was calculated in all township and it was applied for the estimation of served population, since the average was varied township to township.



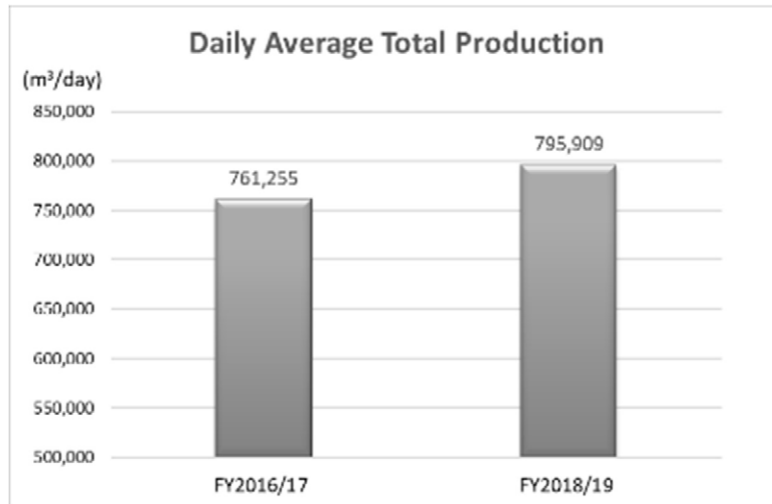


(2) Daily Average Total Production

Daily average total production increased from 761,255 m³/day in FY2016/17 to 795,909 m³/day in FY2018/19, by adding the production volume with 3,500 m³/day. The production volume is expected to be increased after commencement of Lagyunpin WTP operation.

In FY2016/17, this volume was estimated by using pump capacity and operation hours.

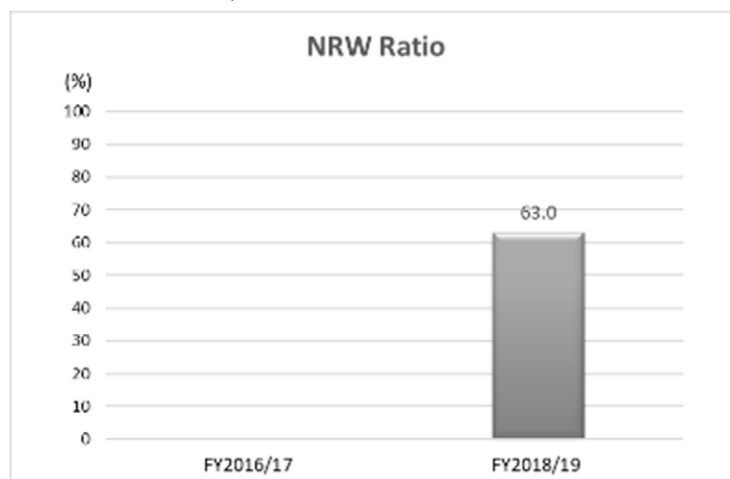
In FY2018/19, since flow meters were installed in 21 main points which enable to estimate water flow volume more accurately, the production volume was estimated based on the available flow data of only one month. In the next year, an annual production data will be available, so that more reliable data will be obtained.



(3) NRW Ratio

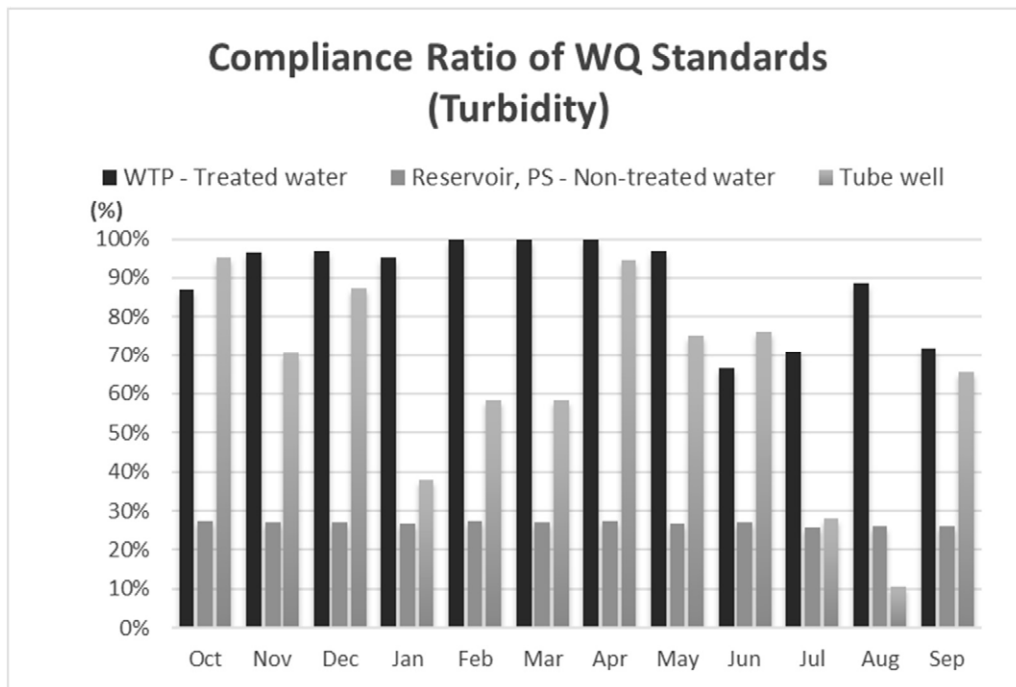
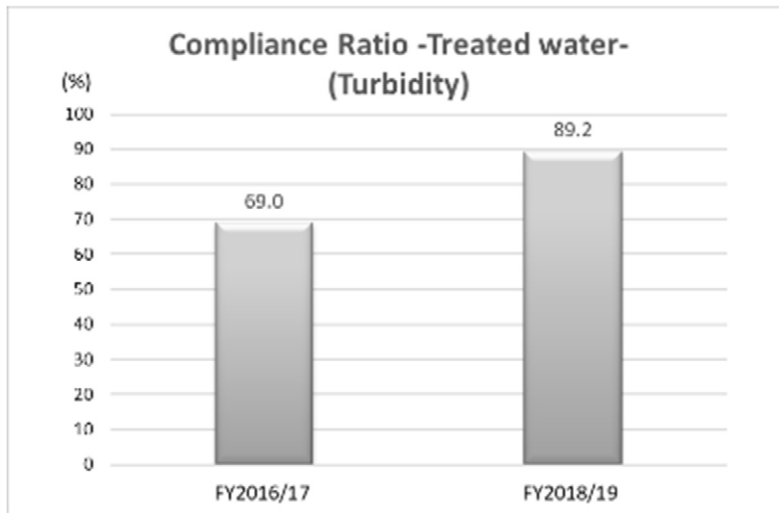
NRW ratio was estimated as 63% in FY2018/19, while the ratio was not indicated in FY2016/17 due to limitation of the information on water flow volume. Master Plan indicated NRW ratio as 66% in FY2011/12.

NRW ratio in FY2018/19 was estimated also based on the available flow data of one month, same as daily average production volume. Hence, In the next year, an annual production data will be available, so that more reliable data will be obtained.



(4) Compliance Ratio of Monthly Water Test in Water Facilities -Treated Water- (Turbidity)

Compliance ratio of turbidity for treated water with the required standard increased from 69.0% in FY2016/17 to 89.2% in FY 2018/19. It could be said that water quality of treated water has been getting improved. This could be attributed to improvement of operation practice of WTP, enrichment of water quality monitoring system and quality management. In the next year, compliance ratio of residual chlorine will be possible to be estimated after starting the operation of chlorine dosing facilities.

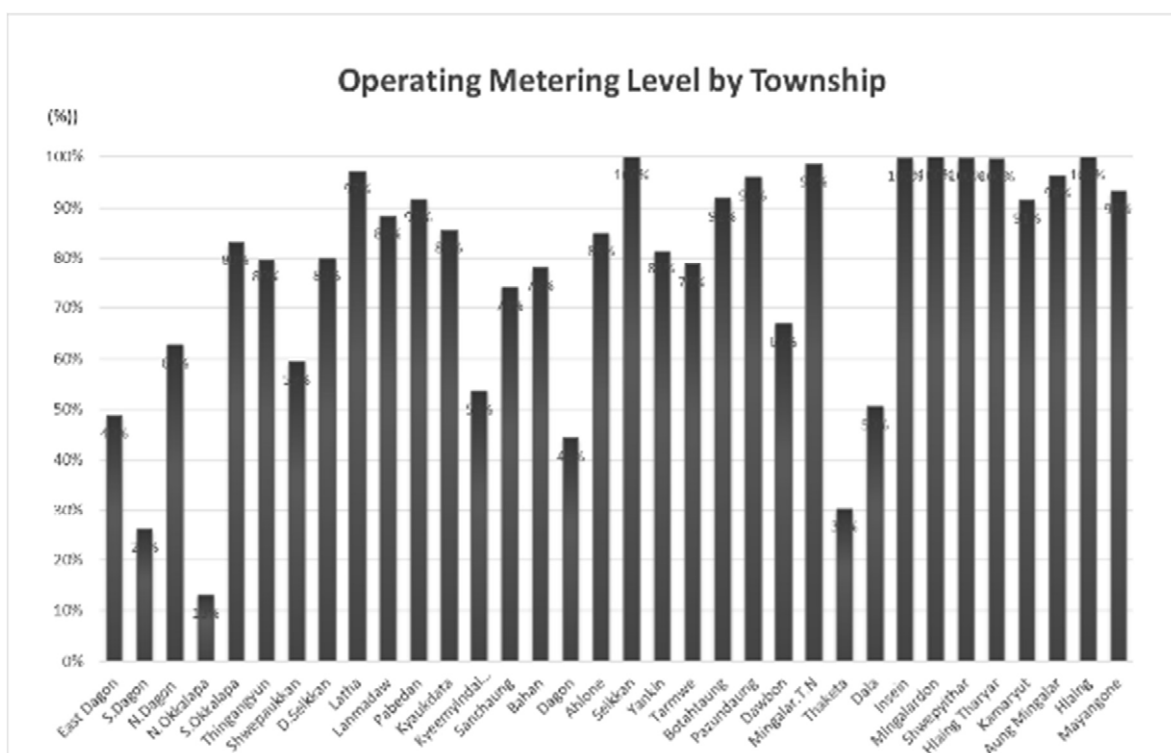
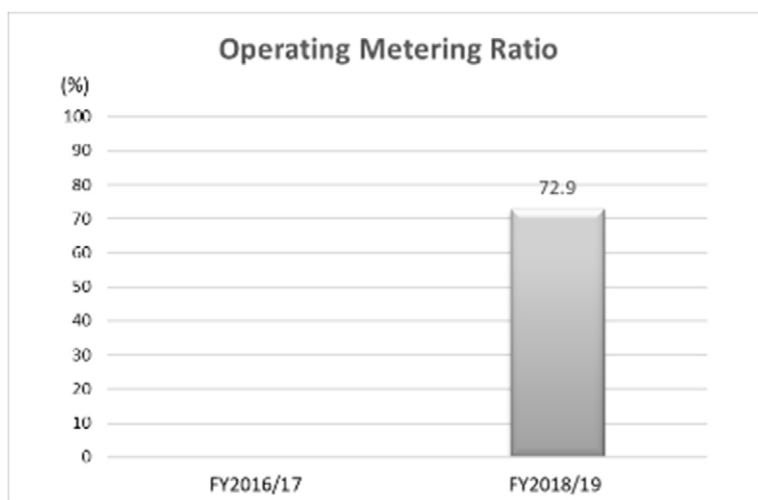


(5) Operating Metering Ratio

Operating metering level in FY2018/19 is indicated as 72.9%. Since the ratio in

FY2016/17 was not available, it is not comparable to the past performance. The judgement and counting for the number of operating meters depends on the assessment of township staffs by an instruction of Planning section. The challenge could be more standardize the assessment criteria comprehensively.

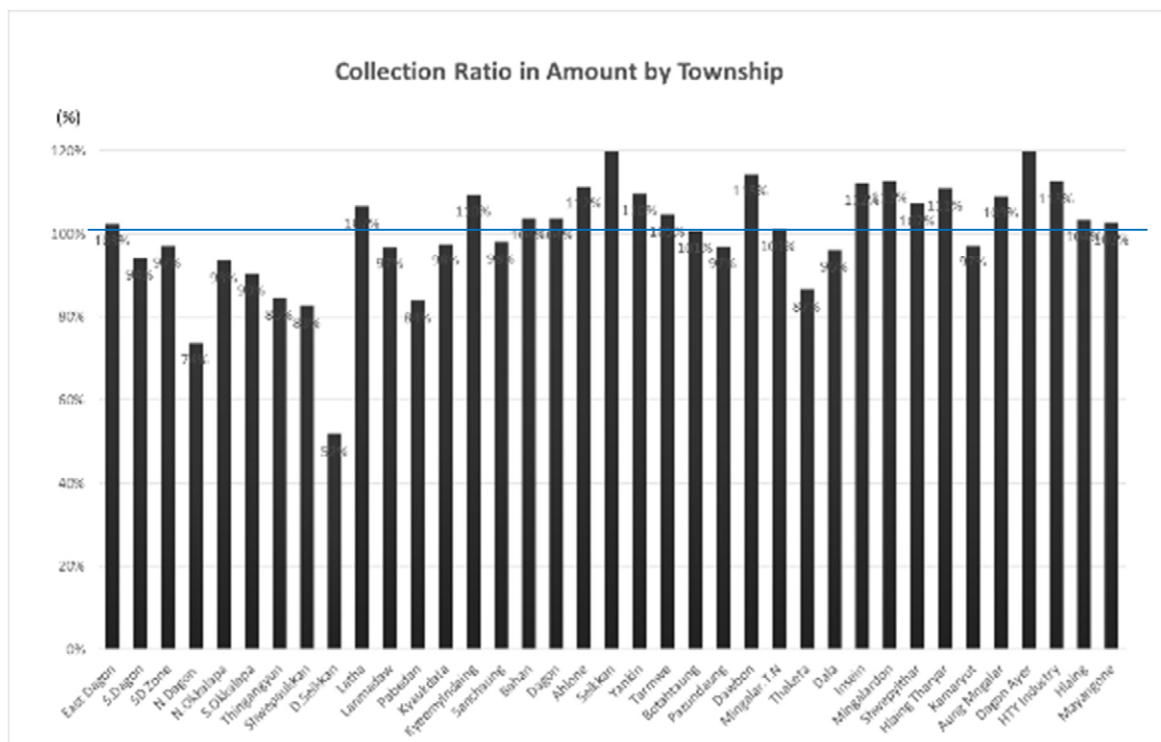
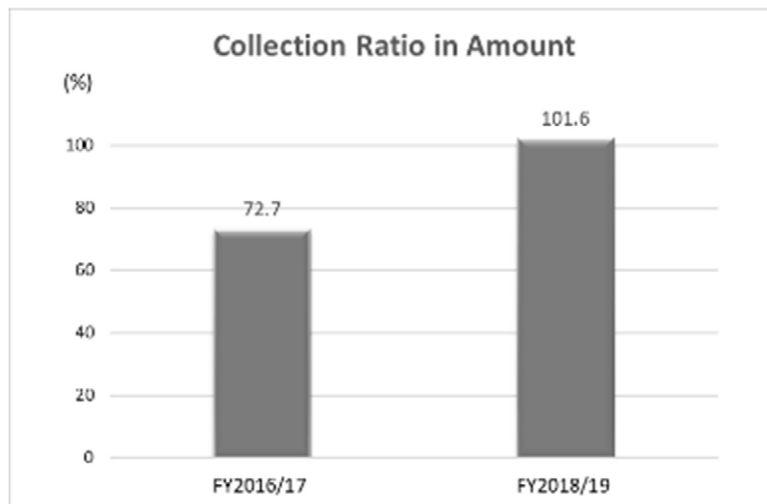
Looking at operating metering level by township base, the ratio of North District shows relatively high ratio, nearly 100%. While, the ratio of North Okkalapa, South Dagon, Thaketa and Dagon townships are low at less than 50%.



(6) Collection Ratio in Amount

Collection ratio in amount meets a dramatic increase from 72.7% in FY2016/17 to 101.6% in FY 2018/19. This is obvious improvement of the operation practice of township and district offices at the forefront and it is also attributed to the top management efforts. Even if outstanding is occurred, the amounts tends to be usually collected during three or four months.

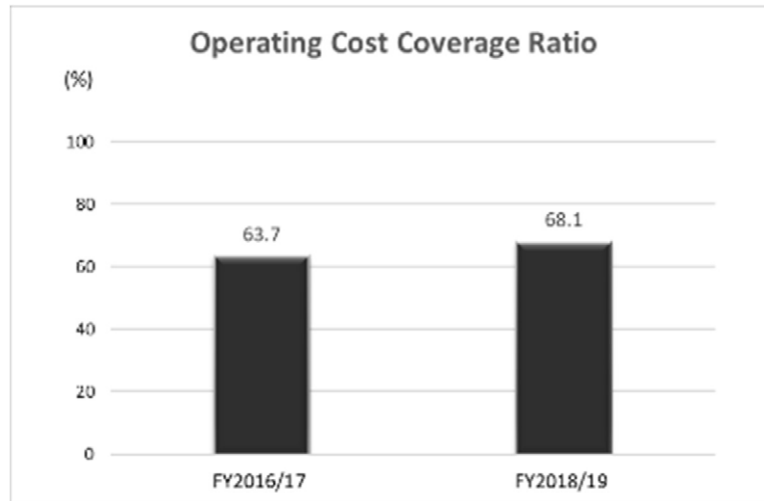
Looking at the ratio by township-base, the ratio of Dagon Seikkan, North Dagon, North Dagon townships are relatively low at less than 80%.



(7) Operating Cost Coverage Ratio

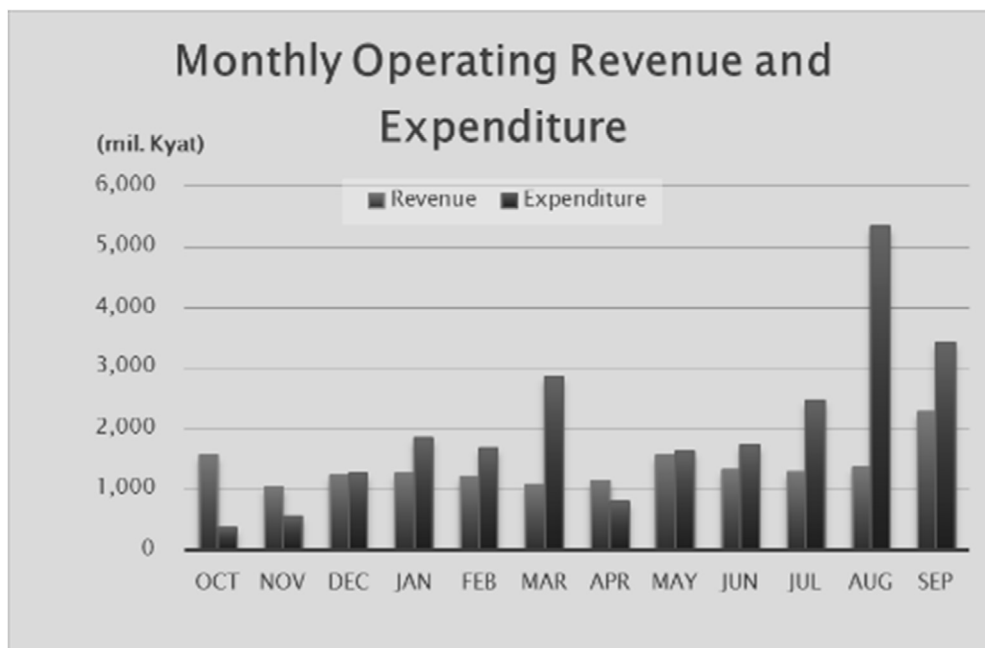
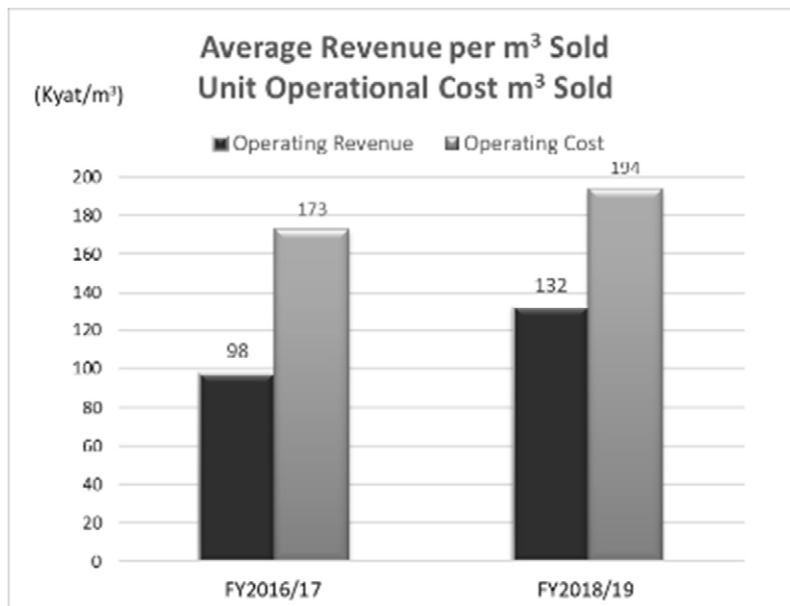
This ratio was calculated by annual operating revenue divided by annual operating costs. The indicator value less than 100% means that operating costs exceed operating revenue, hence the operating cost recovery should be a present target of EDWS.

The ratio shows an improvement of const coverage from 63.7% in FY 2016/17 to 68.1% in FY 2018/19.



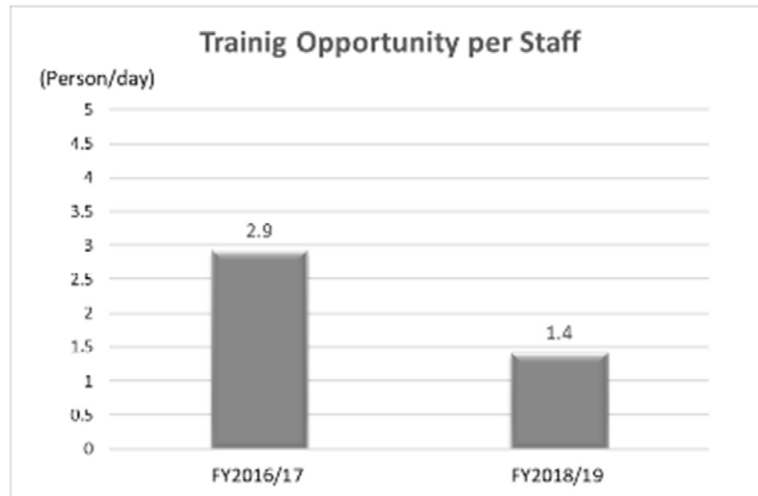
(8) Average Revenue per m³ and Sold and Unit Operational Cost per m³ Sold

Both of unit operating cost and average revenue per m³ shows its increase trend from FY2016/17 to FY2018/19. Unit operating cost per m³ still exceeds average revenue per m³, however the ratio of gap between costs and revenue is getting small. The cost usually tends to be increased year by year, so that continuous efforts to take measure on revenue increase needs to be carried out.



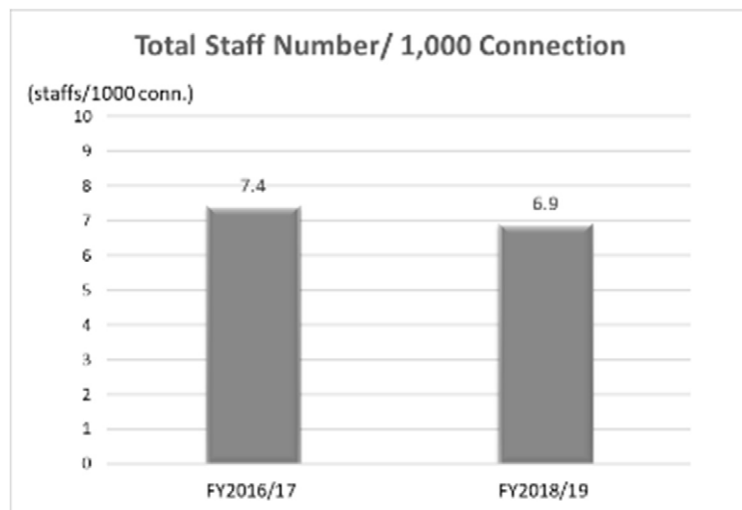
(9) Training Opportunity per Staff

The ratio of training opportunity per staff decreased from 2.9 in FY 2016/17 to 1.4 FY 2018/19. It is assumed that the reason of relatively high ratio in FY2016/17 was attributed to increase of training opportunity associated with JICA technical assistant project, since the period in FY 2016/17 was the beginning stage of the project.



(10) Total Staff Number per 1,000 Connection

Total staff number per 1,000 connection decreased from 7.4 in FY 2016/17 to 6.9 in FY 2018/19. It indicates a slight improvement of management efficiency of EDWS. Institutional reform of YCDC has been carried out, therefore the trend of this ratio should be carefully monitored after the reform.



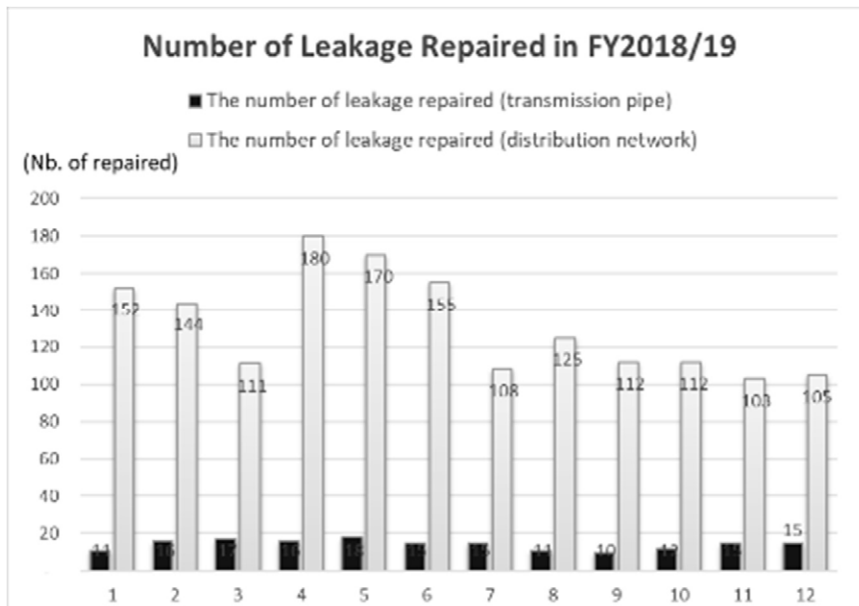
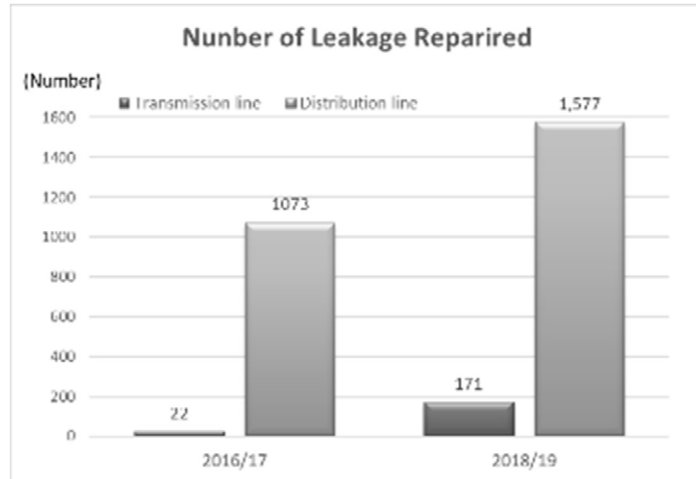
5.2.2. Other KPIs

(1) Number of Leakage Repaired

Number of leakage repaired both in transmission line and distribution line indicates the increased trend as 1.6 times from 1,095 in FY 2016/17 to 1,748 in FY 2018/19. Particularly number of leakage repaired in transmission pipe is assumed to be attributed to the aged pipe such as concrete pipe. The clear reason of this trend

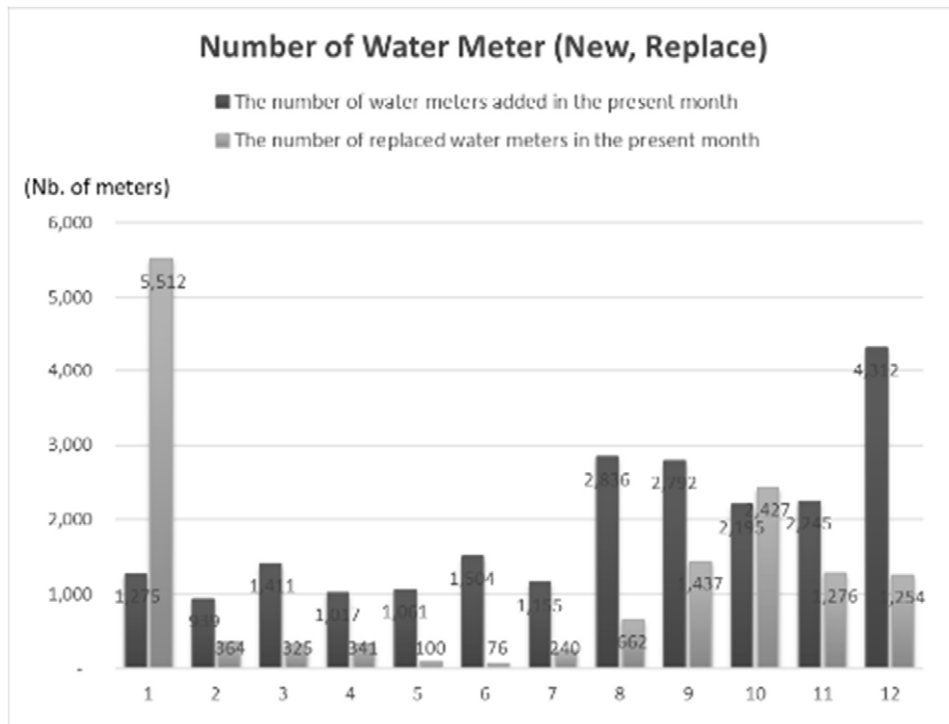
carefully needs to be identified in the monitoring report.

The number of leakage repaired for transmission and distribution seems to be constantly occurred every month.



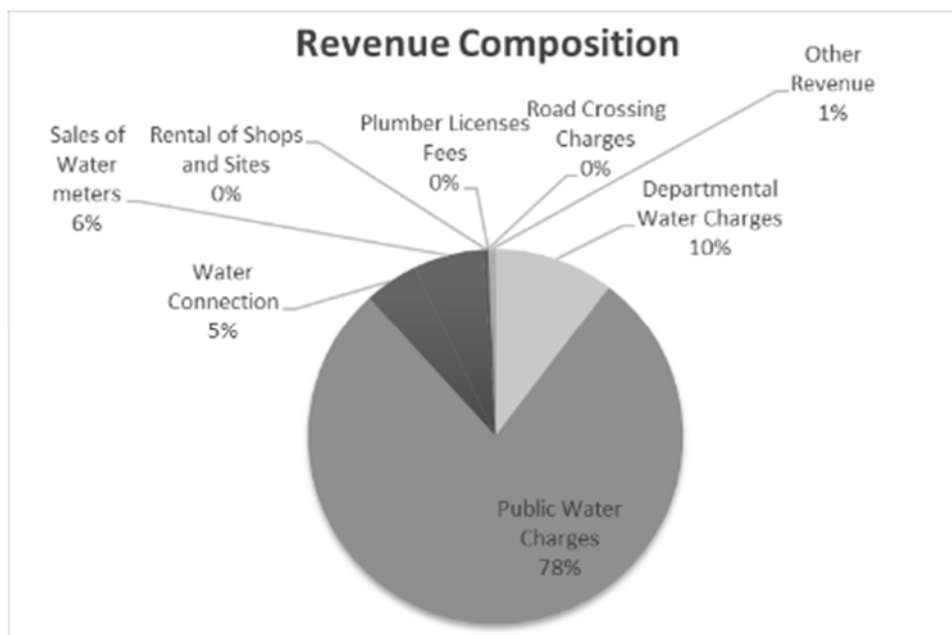
(2) Number of Water Meter (New, Replace)

Number of water meter newly installed in FY2018/19 was 22,742 and number of water meter replaced in FY2018/19 was 14,014. The monthly average of new meter installation and meter replacement were 1,895 and 1,168 respectively.



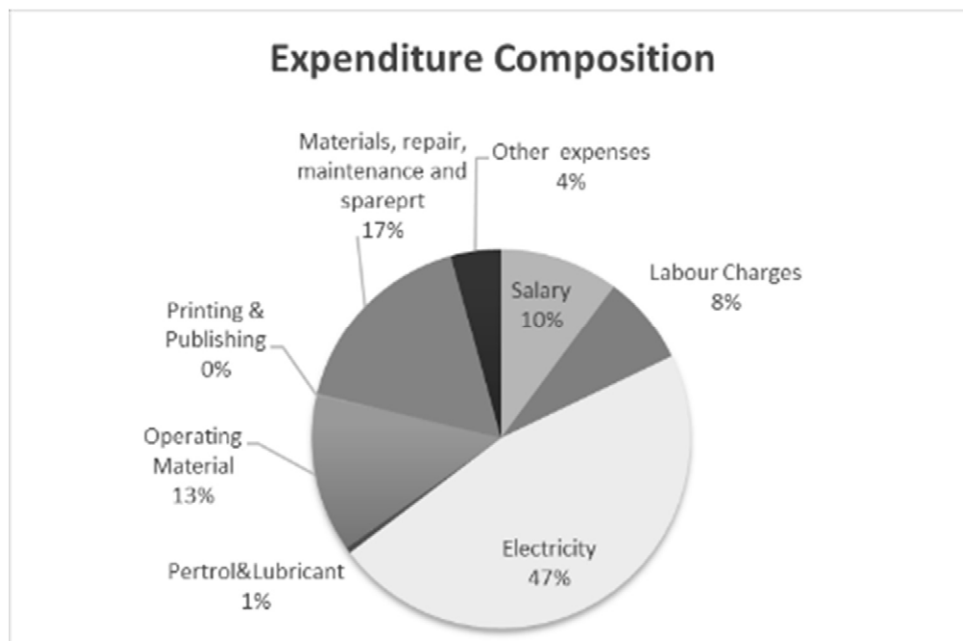
(3) Composition of Revenue and Expenditure

In FY2018/19, The major part of revenue was Public Water Charge with 78% of the total, and followed by Departmental Water Charge with 10%. Hence, 88% of revenue depends on water charge for the supplied water.



In 2018./19, the largest cost was electricity costs which remarkably shares 47% of the total expenditure. The following larger costs were material, repair and maintenance costs with 17% and operating materials including chemicals with 13%.

The trend of electricity expenditure including electricity tariff revision may have large impact on the operating balance of EDWS, it should be carefully monitored in the succeeding years.



5.3. Comparison to Other Water Utility

5.3.1. International Benchmarking Network

The International Benchmarking Network for Water and Sanitation Utilities (IBNET) funded by the World Bank group is an initiative to encourage water and sanitation utilities to compile and share the information of Performance Indicators (PIs). Hence, we are able to access comparative information that will help to promote best practice among water supply and sanitation providers worldwide.

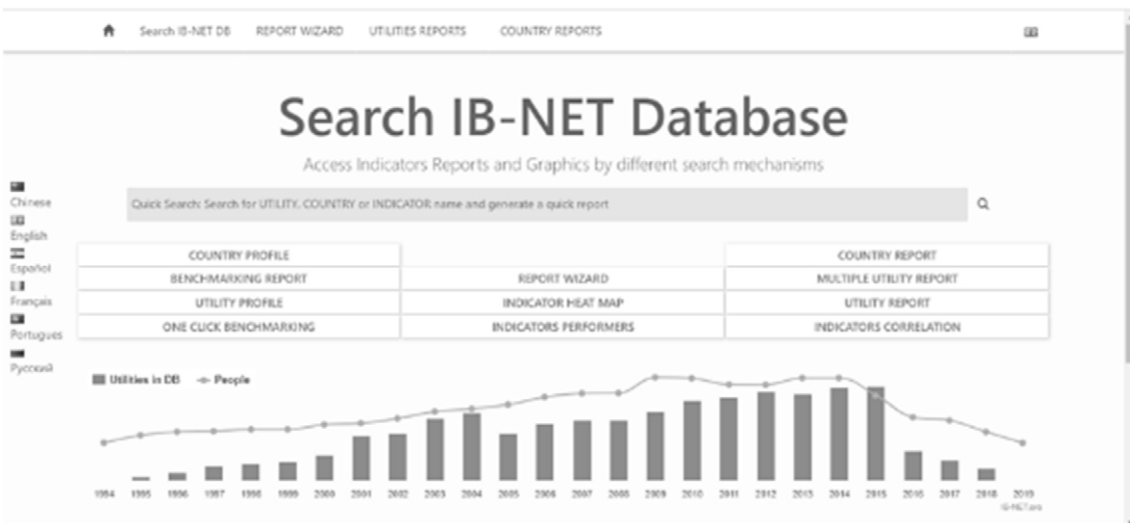
<https://www.ib-net.org/>



5.3.2. Checking Performance of Other Utilities

IB-NET Database provides us key information of other water utilities if the data is registered and is available. The users can extract information from the following database menu according to your needs.

- Country Profile
- Benchmarking Report
- Multiple Utility Report
- Indicator Heat Map
- One Click Benchmarking
- Indicators Correlation
- Country Report
- Report Wizard
- Utility Profile
- Utility Report
- Indicator Performers



(1) Utility Profile

This function provides information on water service status by indicating key PIs, such as “population and coverage”, “consumption and production”, “consumption breakdown”, “non-revenue water”, “network performance”, “revenue, costs and operational cost coverage”, “cost breakdown”, “number of complaints”, and “billing and collection”.

1. Click “Utility Profile”.
2. Select ① one country and ② one utility, from the list.



The screenshot shows a web application interface for selecting a utility. At the top, there are navigation tabs: 'Search IS-NET DB', 'REPORT WIZARD', 'UTILITIES REPORTS', and 'COUNTRY REPORTS'. Below the navigation is a breadcrumb trail 'Home / Select a Utility'. The main heading is 'Select a Utility' with a sub-heading 'Search for Utility's name or choose first a Country and then a Utility from the list'. There is a search input field with the placeholder text 'Quick Search Search for a UTILITY name'. Below the search field, a dark grey bar contains the instruction 'To continue to the report, please select an item from the list'. Underneath, there are two dropdown menus: '1 Country --Select One Country--' and '2 Utility Utility --Select One Utility--'.

3. Quick outlook of the utility profile will be appeared.



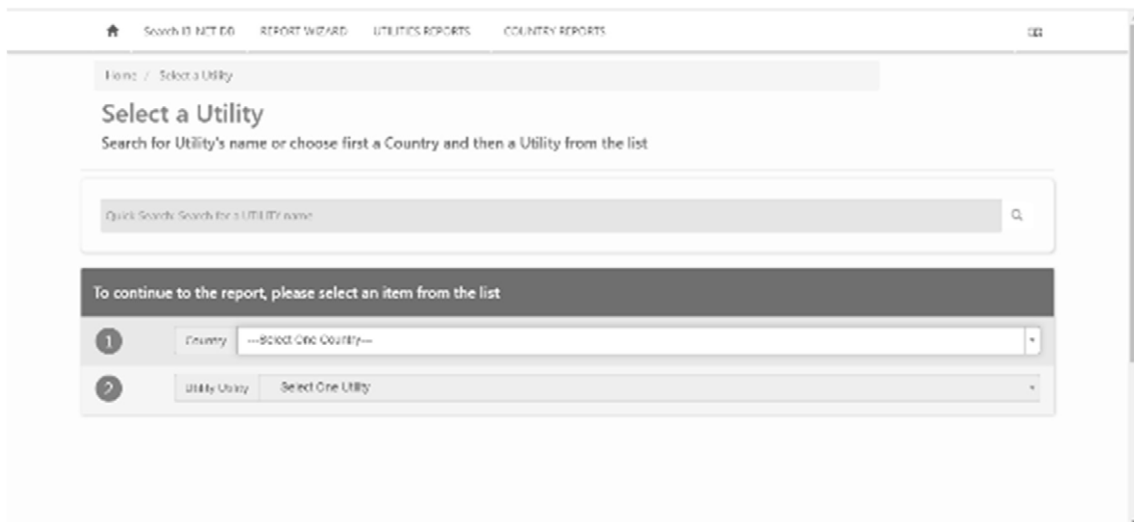
(2) Utility Report

This function provides information on water service status by all PIs registered in the database. The database indicates all periodical data of the registered year.

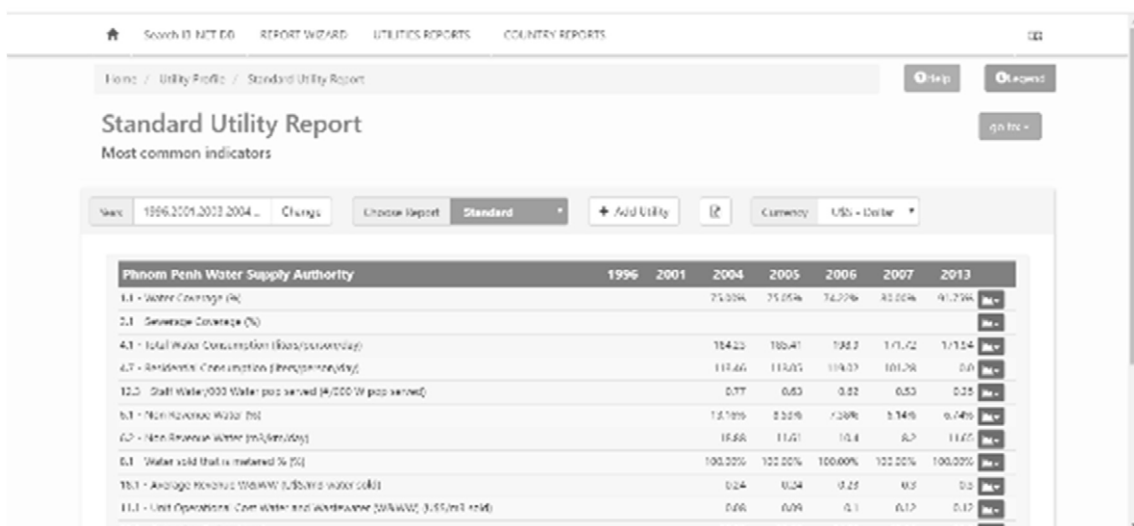
1. Click “Utility Report”.

၁။ ‘Utility Report’ ကို ဝှံ့ဝှံ့ဝှံ့ဝှံ့

2. Select ① one country and ② one utility, from the list.



3. The information can be customized by selecting target “Year”, “Report type” and “Currency”.



Phnom Penh Water Supply Authority	1996	2001	2004	2005	2006	2007	2013
1.1 - Water Coverage (%)			75.00%	75.05%	74.22%	82.00%	91.29%
2.1 - Sewerage Coverage (%)							
4.1 - Total Water Consumption (liters/person/day)			10423	10041	7887	11712	11154
4.2 - Residential Consumption (liters/person/day)			11766	11305	11437	10128	0.0
12.0 - Staff Water/1000 Water pop served (liters/day)			0.77	0.83	0.82	0.83	0.28
6.1 - Non-Residential Water (lit)			18.185	8.828	1388	3.748	6.748
6.2 - Non-Residential Water (lit/person/day)			18.68	11.21	10.4	8.7	11.67
6.3 - Water sold that is metered % (%)			100.00%	100.00%	100.00%	100.00%	100.00%
18.1 - Average Monthly Wastewater (liters/person/day)			0.24	0.24	0.25	0.3	0.3
11.1 - Unit Operations: Com water and wastewater (liters/m3 raw)			0.66	0.69	0.1	0.17	0.17
23.1 - Pollution Discharge (lit)			87.7%	66.97	34.7%	67.3%	82.1

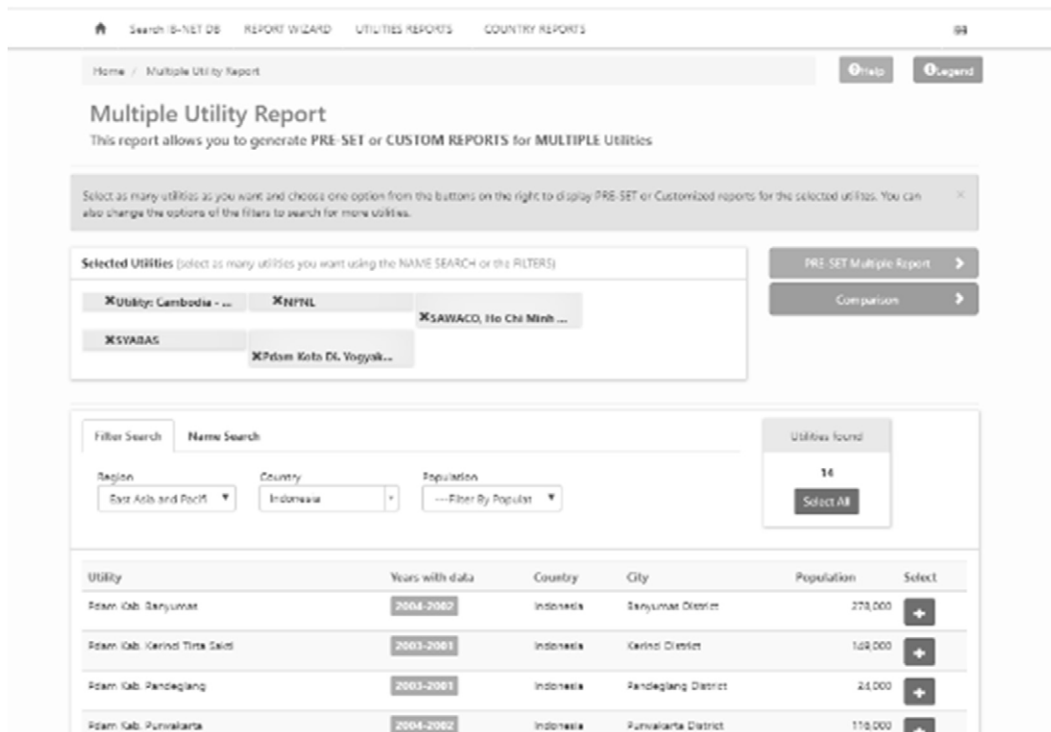
(3) Multiple Utility Report

This function provides information on water service status of the selected utilities. You can compare the performance of the selected utilities periodically.

1. Click “Multiple Utility Report”.

၁။ ‘Multiple Utility Report’ ကို ခွဲဝိပွဲပါ။

2. Select multiple utilities that you want to compare by using “Filter Search” or “Name Search”.



3. Then, you can choose one option from the buttons on the right display, “PRE-SET” or “Comparison”.

Option: PRE-SET

SAWACO, Ho Chi Minh, Vietnam, (2) PPWSA, Cambodia, (3) Pdam Kota Di. Yogyakarta "Tirta Marta", Indonesia, (4) NPNL, Vientiane, Lao PDR (5) SYABAS, Kuala Lumpur, Malasy

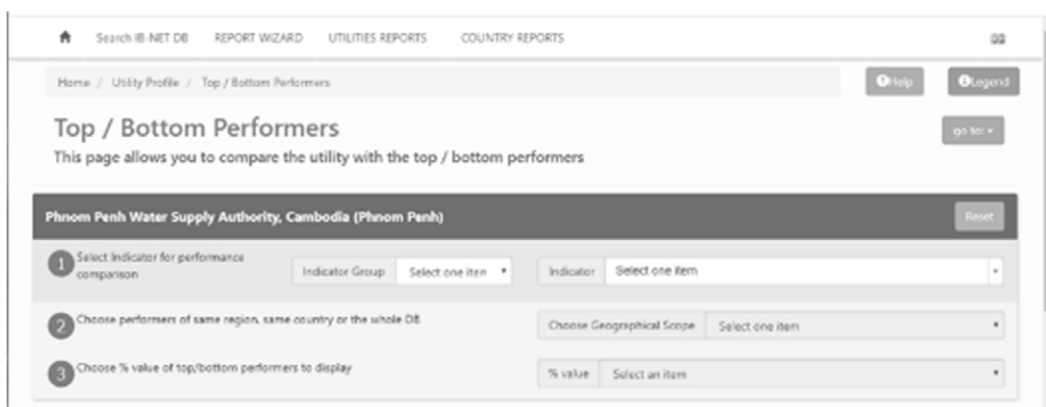
(4) Top/ Bottom performers

This function provides comparative performance information on water service status of top/bottom performers within the country/ region/ whole world. It enable to compare the selected utility's performance with the top/bottom performance in the country/ region/ whole world.

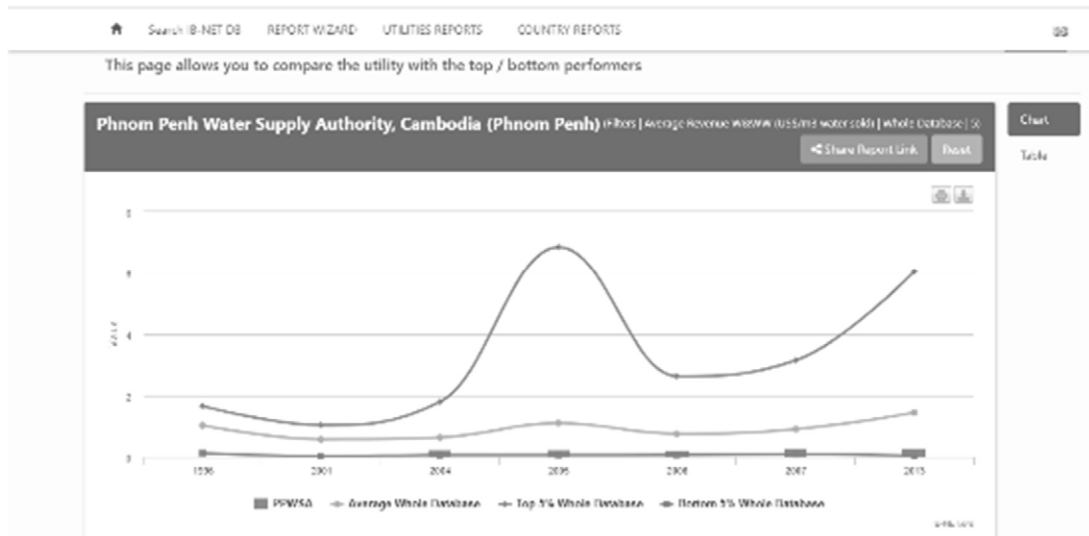
1. Click "Top/ Bottom performers".
2. Select ① one country and ② one utility, from the list.



3. Select ① one PI for comparison, ② utilities of same region/or country/or whole database.
4. Then, choose ③ % value of top/bottom performers to display.



5. The comparison chart will be automatically appeared. The chart shows the % value of top and bottom performance, and the performance of the selected utility periodically.



(5) Indicators Correlation

This function provides an analytical tool to check correlation between the selected PIs. Also, you can check other closest performance of the registered utilities in the selected PIs. This function gives us the comparative performance position of the utility within country/ region/ whole world.

1. Click “Indicators Correlation”.
2. Select ① one country and ② one utility, from the list.

Home / Select a Utility

Select a Utility

Search for Utility's name or choose first a Country and then a Utility from the list

Quick Search: Search for a UTILITY name

To continue to the report, please select an item from the list

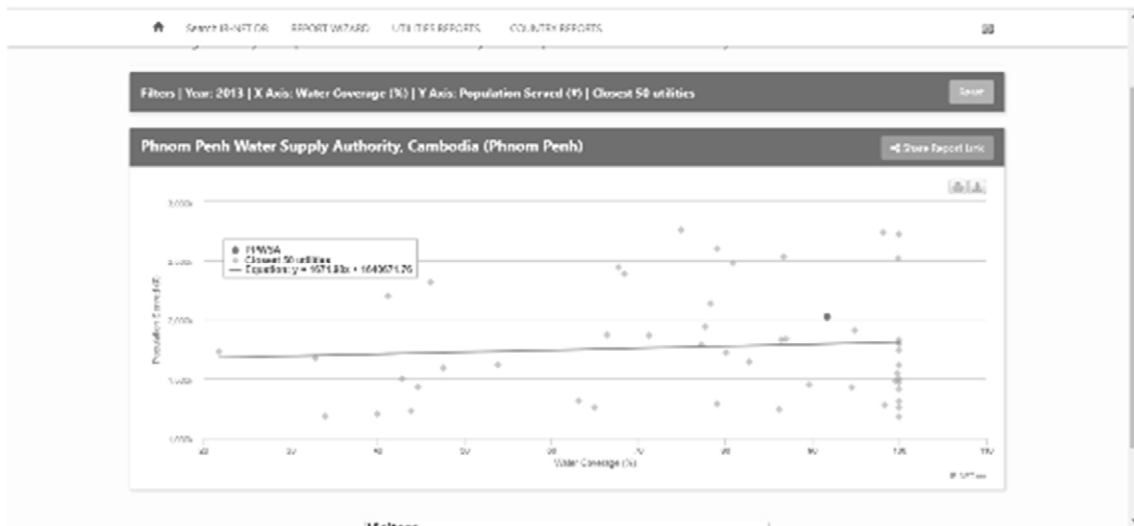
① Country: --Select One Country--

② Utility: Select One Utility

3. Select the target “Year”, “Indicators” both for the X axis and for Y axis. Also choose “Geographical scope” and “Closest utilities – Number”.
4. A correlation figure of 2 indicators will be appeared. If you bring your cursor on the utility dot that you want to check, the other utility information will be

shown.

The following sample figure is made by setting the conditions; Country: Cambodia, Utility: PPWSA, Year:2013, X-axis: Water Coverage, Y-axis: Population Served, Geographical scope: Whole database, Closest utilities -Number: 50.



International Benchmarking Network homepage, <https://www.ib-net.org/>

Annex-2: Regulations, Standards and Guidelines for Water Utility Management

Annex-2.A: Water Resources and Water Supply Regulation (Draft)

Annex-2.B: Guidebook for Water Tariff Setting

Annex-2.C: Maintenance of Fixed Assets Lists

Annex-2.D: Customer Management Manual (Draft)

Annex-2.E: Standard Operating Procedures (SOP) of All Sections of WRAWSA (List only)

Annex-2.A: Water Resources and Water Supply Regulation (Draft)

Draft: Water Resources and Water Supply Regulation

2020.01.31

	Chapter 1 Terms and Definition
Title	1. This regulation shall be called YCDC water supply regulation.
Terms and definition	2. The terms in this regulation shall mean the same as in YCDC law. Moreover, the terms below shall mean as follow;
	(a) Law means 2018 YCDC Law.
	(b) Water Supply means the distribution of water for the public within the city boundary, by the committee, by transmitting water from reservoir, stream, creek, lake and river, and underground water through open channel, transmission pipe, various distribution and service pipes and other water supply facilities.
	(c) Water Supply System means the distribution system of water from Committee-owned water supply utility through transmission pipe or other ways.
	(d) Illegal connection means direct or indirect connecting of water from utility's water supply system into the building, compound or any place, or installation of electric or fuel pump and hand pump without Committee's permission.
	(e) Performing beyond the permission means performing beyond the specified connection permit.
	(f) Transmission pipe means the water pipe that transports water from lake, reservoir and treatment plants to storage reservoir or distribution pipe under the water supply system of Committee.
	(g) Distribution pipe means the water pipe network that conveys water from storage reservoir or transmission pipe under the water supply system of Committee to service pipe in order to distribute water to each township.
	(h) Service pipe means the water pipe connecting to collective residence or individual residence to access water from Committee's water supply network. That term will include all related materials installed on the pipe.
	(i) Water Charges means the charges for consumption of Committee water collected from customers by meter rate, or flat rate according to customer category.
	(j) Pipeline Boundary means the alongside area of 25 feet from transmission pipeline of water supply system.
	(k) Water Connection Permit means the permit, issued by the committee, which allows the access of water from the Committee's water supply system .
	(l) Non-revenue Water means the water wasting/loosing from Committee's water supply system due to various reasons.
	(m) Owner means the person who gets granted the water connection permit to access the water from the Committee's water supply system and who pays all related cost of water meter, service pipe, other related materials and installation fee by his or her own. Owner

	<p>can be the owner of building or room accessing the Committee's water.</p> <p>(n) Customer means the person who gets the water access and consume the water from water supply system of the Committee, and who is responsible to pay for its consumption. That customer can be the owner of building or room, or can be the tenant resident living in some other way.</p>
	<p>Chapter 2 Water Resources</p>
Committee's power and duty to develop new resources	3. The Committee shall manage and perform the exploration of new water resources, by applying modern technologies, within the city territory or outside in order to supply clean and adequate water to the citizens residing inside the municipal area.
Water shed	4. The Committee shall preserve the stipulated catchment area of reservoir for its sustainability in collaboration with relevant departments.
Water pollution measures	5. The Committee shall adopt the measures to ensure the quality of water in reservoirs and the plan to prevent the contamination of water in reservoirs.
Conservation of forests	6. The Committee shall manage to take action, in line with the law, on any activity that harms or threads the forest within the stipulated area of reservoirs owned by the Committee.
Prohibition of reservoir sanctions	7. The Committee can prohibit and penalize the followings: jungle clearance, cultivating and gardening, quarrying, making brick, constructing shops or buildings within the premises of pipeline area, or compound or on the bank of lake and reservoir, and removing, relocating or destroying the materials related to water pipes, reservoir compound and reservoir bank without Committee's permission.
Prohibition on lakes	8. The Committee can prohibit and penalize the followings activities within Inya Lake, Kandawgyi Lake and other lakes of the Committee without the Committee's permission: accessing water, rowing, swimming, fishing, washing clothes, bathing, digging, backfilling, car washing, Drainage Bridge, building construction, garbage disposal and waste disposal.
Boundary restrictions on lakes	9. The committee can prohibit and penalize the construction works within 30-feet distance from the stipulated area of Kandawgyi and Inya Lake.
Ecological plans	10. The Committee can negotiate with the relevant Departments and organizations to promulgate the orders as needed in order to prevent destruction of Eco-environment during the implementation of water resources and water supply works.
Committee's power and duty on rainwater harvesting	11. The Committee can coordinate with relevant departments, organizations and individuals to store rain water every raining season.
Groundwater plans	12. The Committee can coordinate with relevant departments, organizations and individuals to manage ground water extraction within city territory.
	<p>Chapter 3 Water Supply Works</p>

Committee's duty to supply water	13. The Committee can negotiate with the relevant departments, organizations and individuals to supply clean and adequate water to all citizens residing within City Municipal Area.
Water supply	14. The Committee has the right to pass through any land or to place the machineries and equipment on any land in order to construct, inspect and repair the water supply facilities inside or outside the City Municipal Area. In that regard, the destruction can be compensated as to current value with negotiation.
Authority What can be done Crossing water pipes in the road and bridge area Relevant pre-negotiation emergency	15. The Committee can perform the following works: (a) Laying the pipeline for water supply either passing through the road or any place which is intended to construct the road, or over/under/alongside the channel, creek, pond and lake. (b) Laying the pipeline either passing through any land or building, or under/over any land or building. (c) Informing the respective owner or tenant of the house/building in advance before performing the works in Article (a) and (b) above, and negotiating with the respective Department or Organization for department or organization owned buildings. (d) Implementing the works without negotiation mentioned in Article (c) above, in case of emergency.
Coordination on pipelines; Negotiation for construction	16. The governmental department or an organization or a person, which/who wants to extend, repair or construct a building or bridge or road or railway over distribution pipe within the city or on transmission pipe within or outside of municipal area, shall negotiate with the Committee in advance.
Construction authority on water pipes	17. The Committee has the right to manage and prevent constructing, repairing or extending of road, railways, bridge or building over the main transmission pipes or distribution pipes within municipal area.
Prohibition within the boundaries of the pipeline	18. The Committee has the right to stop and take action on cultivation, quarrying, making bricks, and constructing buildings and bridge, material piling up and ground digging within the pipeline boundary without Committee's permission.
Water Loss	19. The Committee can make arrangements to prevent water loss.
Water quality standard Standard for water supply facilities	20. (i) The Committee shall manage the water quality to be in line with WHO standards and the National Drinking Water Standards. (ii) The Committee shall prescribe the standards of pipelines, reservoirs, tube wells and pumps and water supply facilities, and comply the standards.
Prohibition if found unhealthy	21. The Committee can manage and coordinate with relevant departments and authorities for the prohibition of the public and private water supplies that do not comply or meet health standards with the negotiation
	Chapter 4 House Connection

Water supply system	22. The Committee can permit the connection to access committee's water in line with the stipulations. In that regard, water meter system or other appropriate system can be applied.
Requirements for approval Direct water connection Secondary pipe Working to get more water	23. Anyone who want to perform the followings, shall apply the permission at the Committee – a. To get direct water access by punching the Committee's water pipe b. To install secondary pipe diverged from service connection permitted by the Committee c. To apply or use electric or other fuel/energy, hand pump in order to extract or access more water from the permitted connection.
Application for water connection	24. The Committee may, in principle, approve or reject the application for water contract. If approved, the applicant must pay the specified service fee.
Rules and regulations Fees and permits Costs Supervision by staff Damage to water pipe	25. The Committee can instruct the following rules to be obeyed for new connection installation: a. The permitted customer (applicant) shall pay the specified service charge (including water meter costs) and follow the prescribed installation standards. b. The permitted customer (applicant) shall pay all related costs to install the house connection from the distribution pipe owned by the Committee. c. The permitted customer (applicant) shall carry out the plumbing works in standard format with the supervision of the Committee Staff in-charged. d. The customer shall be responsible to protect service connection pipelines from damages. If any damage occurred due to lack of customer's care, customer shall obey the decision of the Committee.
Owner responsibility Secondary connection Home water supply pipe Tenant	26. The responsibilities of connection owner regarding the house connection are as follows: a. not installing secondary connection without permission of the Committee b. not replacing or removing the house connection without Committee's permission
To store backup water	27. If the house owner whose house gets water from YCDC water supply denies or is absent to allow the temporary or rent residents to consume water, or if the house owner whose house gets water from YCDC water supply doesn't contribute water to temporary or rent residents enough, those tenant or residents can apply the separated house connection at the committee and the Committee can allow the house connection permit or appropriate use with the stipulated service charges payment.

	To store water for 36 hours consumption besides daily consumption per capita and to configure a reserved reservoir with the storage capacity stipulated by Fire Department for firefighting purpose.
Standard of material	28. The Committee can stipulate the standards of the size, material type, quality and structure of materials to be installed in service connection of a building or a place, that will access water from Committee’s water supply system.
Inspection	29. The Committee, regarding water supply works, has the right to inspect any building or any land with accompany of relevant ward or village tract administrator, village tract in-charged or head of 100-household group or head of 10-household group together with two witness at least.
Withdrawal of water connection permit	30. If the owner or resident is found out to have engaged in illegal water connection, or absence to pay the water charges, or failure to comply with the rules and instruction of water consuming, or lack of care to prevent damage to the water connection, or cause of water loss, the Committee has the right to cut the connection off or provoke the connection permit.
	Chapter 5 Water Meter
YCDC and customer’s responsibility for water meter	31. Concerning with the Water meter installation – <ul style="list-style-type: none"> a. The Committee has the right to manage the meter installed. b. The Committee shall grant hiring meter with specified rate. c. The specified Meter maintenance fee or leasing fee shall be charged on the meter leased by the Committee. d. The customer shall not perform the follows: damaging meter, repairing meter, changing or replacing meter, removing the parts of meter, connecting secondary pipe behind the meter. e. The customer shall be responsible to protect the water meter and responsible to compensate if the meter is lost or stolen. f. The customer shall be responsible to pay the cost for replacement of meter damaged due to lack of customer’s care. g. The Committee shall determine whether the water meter should be validated and what should be done if it expires.
How to install Meter	32. The customer shall follow to perform the followings – <ul style="list-style-type: none"> a. The meter shall be located in the place, within the premises of customer, where the responsible staff can easily access meter reading and inspection. b. The meter shall be installed by following the installation standards of the Committee.
Meter test	33. The Committee : <ul style="list-style-type: none"> a. Can specify the period of meter testing for maintenance properly.

	b. Can take out the meter any time with repair or function test purpose.
	Chapter 6 Water Tariff and Billing
YCDC right to sell water and charge	34. The Committee can perform the followings with regard to the consumption of Committee's water: <ul style="list-style-type: none"> a. Charging for water consumption b. Selling water by setting proper tariff c. Charging water tariff for its consumption if the construction and other activities consume the water from the water supply system.
Foreign Currency	35. The Committee shall charge the water charges and service fee in line with the specified rate from the followings: <ul style="list-style-type: none"> a. Housings, apartments and buildings leasing in foreign currency b. Hotels, motels, and guest houses charged in foreign currency c. Businesses with foreign investments
Consumer & owner 's responsibility to pay	36. For bill payment, <ul style="list-style-type: none"> a. The customer shall be responsible to pay the bill for the consumption of water from Committee's water supply system. b. If the consumer is absent to pay the water bill, the house owner shall be responsible to pay it.
Customer change	37. To amend the customer name or to change the connection category shall be applied at the Committee by filling the application.
YCDC's right to draft rate	38. If necessary to amend or revise the water tariff, the proposal shall be submitted to relevant authority for approval.
YCDC's power for disconnection Allow reconnection	39. The Committee; <ul style="list-style-type: none"> a. has the right to cut the connection off if the customer is absent to pay the bill or fail to comply with the instructions stipulated by the Committee. b. The Customer whose connection is cut off according to Section 43-a, can apply the reconnection after debt payment or obeying the instructions. In that regard, the Committee can approve the reconnection application after the customer had paid fine, debt and service charges.
	Chapter 7 Prohibition
Illegal connection	40. No one can connect water illegally.
Water meter prohibition	41. No one can damages water meter, can make the meter functioning delay and can prevent easy meter reading.
Limit water use	42. No one can do the following activities to use the Committee owned water supply system: car washing with tap water, watering streets.

Comply with rule, etc.	43. No one can fail to comply with the instructions, rules and orders issued, according to this regulation, by the Committee.
Take action	44. Anyone who violates any prohibition in this regulation shall be taken action according to Yangon City Development Committee Law.
	Chapter 8 General
YCDC's right to delegate task	45. The Committee can delegate and assign the tasks or activities to be implemented to relevant department/authority, organization or person under the Committee in line with this regulation.

Annex-2.B: Guidebook for Water Tariff Setting

Guidebook for Water Tariff Setting in YCDC

JANUARY 2021

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Exercise I

Exercise II

I. Background

1. Introduction

1.1 Yangon City Development Committee; The Department of Engineering (Water and Sanitation) (EDWS) has been carrying out financial matters under the Union Fund since 1.10.2011. EDWS uses the Government Accounting System, which maintains single entry system and compiles accounts based on the Cash Basic system. Using the Government Accounting System Based on the Cash Basic system, there is a lack of inventory for fixed assets, incomplete depreciation rates, lack of depreciation accounts. There are no accounting results such as Profit & Loss Account and Balance Sheet. There is a need to establish specific guidelines and guidelines for accounting policy, as well as specific policies and procedures for setting water tariffs.

1.2 EDWS water tariffs are very low compared to other countries and meter maintenance rates are not in line with modern prices. The current water tariff has been increased from the 2012-2013 financial year as it was allowed to be collected from the 2012-2013 financial year in accordance with Article 151 of the Resolution No. (4/2012) of the Yangon Region Government. There is also a need for a specific authority for EDWS to set tariffs. Some religious buildings; There is a need to list specific water consumption units for FOCs, such as schools, and make effective management. Increased FOCs; Rising raw water prices; Electricity bills and chemicals used in water purification; Factors such as rising prices for other accessories have widened the gap between EDWS revenue and expenditure.

1.3 Regarding foreign loans, MY-P5 loan agreement was signed on 5-9-2014 between the Treasury Department of the Ministry of Planning and Finance and the Japan International Cooperation Agency (JICA) on behalf of the Government of Myanmar and a loan of 23.683 billion yen from the Government of Japan for the Yangon City Development Project. A supplementary loan agreement was signed between the Ministry of Planning and Finance and the Yangon City Development Committee (YCDC) on 10.7.2015 to implement the project. For this MY-P5 loan, we have been borrowing since the 2015-2016 financial year, and we have been paying interest on the loan with interest rate of 0.01% from the 2015-2016 financial year. The loan has a fixed term of 10 years and must be repaid at the rate of two annually within 30 years after the end of the term. Thus, the loan under Contract No. MY-P5 will be repaid within 30 years from the fiscal year 2026-2027 starting from the loan of 23.683 billion yen.

1.4 The Japan International Cooperation Agency (JICA) signed a loan of 25 billion yen with the loan agreement MY-P19 on March 1, 2017 to implement the Phase II of Yangon City Water Supply Development Project

1.5 EDWS has to repay its loans and invest heavily in future water supply projects, and the need for large sums of money to increase existing expenditures to sustain existing water supply projects has led to an increase in the cost of water, which is EDWS 'core revenue. Guidelines need to be drawn up for a systematic increase in EDWS tariffs. Therefore, I will present this guideline under the following headings:

- (a) Water Tariff in Yangon
- (b) Comparison of Water Tariff
- (c) Guideline for Water Tariff Setting in EDWS

2. Water Tariff in Yangon

2.1 According to the Municipal Law of 1874 and the Yangon Municipality Act of 1992, Cleaning tax; Light tax Water tax and water tax were collected by the Assessors Department and later by the EDWS as property tax. Table 1 shows the gradual changes in water tariffs collected by EDWS from 2001 to 2015.

Table (1) EDWS tariff changes from 2001 to 2015

Type	Customer	2001	2002	2005	2006	2012	2013	2014	2015	Unit	
Metered	Household	6.6 (Kyat)				88 (Kyat)			88 (Kyat)	Kyat / ml	
	General	Commercial	29.7 (Kyat)		77 (Kyat)		110 (Kyat)		110 (Kyat)	Kyat / ml	
		Construction	29.7 (Kyat)		77 (Kyat)		110 (Kyat)		110 (Kyat)	Kyat / ml	
	Department	Building	4.4 (Kyat)		55 (Kyat)				88 (Kyat)	88 (Kyat)	Kyat / ml
		Factory	4.4 (Kyat)		77 (Kyat)				110 (Kyat)	110 (Kyat)	Kyat / ml
	FE	Household	0.44 (US\$)					440 (Kyat)		440 (Kyat)	Kyat / ml
Commercial Hotel, Motel, inn, etc		0.88 (US\$)					880 (Kyat)		880 (Kyat)	Kyat / ml	
Flat	General	Household Ordinary	120 (Kyat)		1125 (Kyat)		1800 (Kyat)		1800 (Kyat)	Kyat / month	
		High class			1875 (Kyat)		3000 (Kyat)		3000 (Kyat)	Kyat / month	
	Commercial	135 (Kyat)		1575 ~ 57068 (Kyat)		2250 ~ 81525 (Kyat)			Kyat / month		
	FE	Household	25 (US\$)							US\$ / month	
		Commercial	35 ~ 1440 (US\$)					27000 (Kyat)		27000 (Kyat)	Kyat / month
	Hotel, Motel, inn, etc	0.5 (US\$)								US\$ / guest / day	
Construction		83.6 (Kyat)		155 (Kyat)		217 (Kyat)		309.6 (Kyat)		Kyat / sq-m	

2.2 EDWS is currently collecting water tariffs from the 2012-2013 financial year. Customers who have not yet installed a water meter will be charged a fixed rate of 1,800 Kyats per month for home use. For commercial use and large plots of land at the rate of 3,000 Kyats / month; Water bills are collected with quarterly consolidated invoices. The current water tariff is shown in Table 2:

Table 2 Water rates charged by EDWS in 2018-2019 fiscal year

No.	Category	Kyat (1 Unit - m ³)
1	Meter (Domestic) House, YCDC Staff, Department	88
2	Meter (Commercial) Business, Department	110
3	Meter (FE) House Commercial	440 880

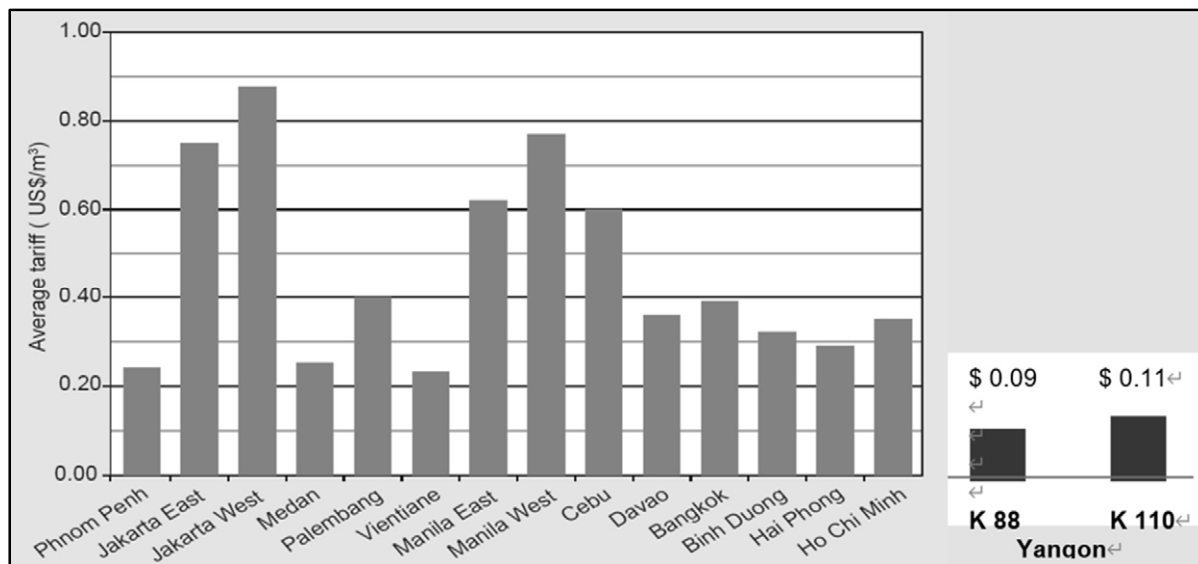
4	Flat House (Normal) Large House, Commercial Garden	1800 3000 270000 / Month
No.	Category	Kyat (1 Unit - m³)
1	Meter (Domestic) House, YCDC Staff, Department	88
2	Meter (Commercial) Business, Department	110
3	Meter (FE) House Commercial	440 880
4	Flat House (Normal) Large House, Commercial Garden	1800 3000 270000 / Month

Meter Manintaince fees (House,Commercial) 100 ks / month

Meter Manintaince fees (FE) 1000 ks / month

2.3 Statistics at the end of 2011 show that EDWS tariffs are very low compared to some ASEAN countries:

Average Tariff ASEAN Cities (End of 2011)



2.4 In April 2018, EDWS reported that the total number of connections used in the water supply network was 34,0122, with 48,783 flat connections and 230,279 metered bills. A total of 2,300 FOC connections and a total of 58,760 suspended connections were found. The following table (3) shows the water consumption situation from 2012 to 2018:

Table 3 List of water consumption (up to 2012-2018)

No	Year	Flat connection ပုံစံ သဘော :		Metered connection မီတာရှိသော ဓာတ်ကြိုးပေးမှု		FOC	Total connections in End of April(source; ACE office) ဓာတ်ကြိုးပေးမှု ဓာတ်ကြိုးပေးမှု ရရှိပေးပါင်း (ACE ရုံးချုပ်)
		Flat Bill (ပုံစံ ထ)	Flat Suspend (ပုံစံ ထ ဆိုင်းထိုင်)	Metered Bill (မီတာ ဓာတ်ကြိုးပေးမှု)	Metered Suspend (မီတာ ဆိုင်းထိုင်)		
1	2012	55,131	7,557	155,961	34,843	2,530	256,022
2	2013	54,049	10,402	163,677	48,326	2,452	278,906
3	2014	54,998	19,893	176,279	50,083	2,415	303,668
4	2015	49,292	17,277	192,516	46,794	2,481	308,360
5	2016	55,902	10,578	214,779	43,778	2,248	327,285
6	2017	45,028	9,315	228,388	49,902	2,382	335,015
7	2018	48,783	12,828	230,279	45,932	2,300	340,122

3. Comparison of Water Tariff

3.1. MCDC Water Tariffs

The following is a comparison of YCDC (EDWS) water rates with MCDC water rates:

3.1.1 MCDC has been collecting water bills since 1989. Water meter collection with water meter will start from 4/2017. The water tariff has been increased from 7/2017 for water supply. If the water bill is not paid by the due date, overdue fines will be charged as arrears. Overdue fines are charged at the rate of 1,000 Kyats per month and up to a maximum of 3 months. The meter maintenance fee is 100 Kyats per bill. The steps of MCDC's water tariff changes and the water tariffs collected in the current 2018-2019 fiscal year are as follows:

Water Tariff in Mandalay

No.	Period	Cost per 1 unit (Kyats)	Cost per 1 unit (USD)	Comment
1	1989-1996	5	0.004	
2	6/1996-11/1997	10	.007	Above 90 units
3	12/1997-8/1999	11	.008	
4	9/1999-11/2005	10	.007	
		15	.011	Above 90 units
5	12/2005-2/2006	25	.018	
		30	.022	Above 90 units
6	3/2007-11/2010	55	.04	
7	12/2010-3/2015	55	.04	Domestic
		77	.057	Commercial
8	4/2015-3/2017	85	.063	Domestic
		110	.081	Commercial
9	4/2017-Today	200	.147	Domestic
		260	.191	Commercial

from Ms Khin May Htay on 1st August 2017 at JICA Yokohama Forum

Mandalay Water Tariff Revision

• Domestic	55 → 85 → 200 /m ³	2.35
• Commercial (Medium)	77 → 110 → 260	2.36
• Commercial (Industry/Factory)	440 → 660	1.5
• FE (Commercial)	490 → 880 → 1,100	1.25

• Moat Water (fixed according to pipe sizes)		
• 1/2 inch	1,500 → 4,000	2.7
• 3/4 inch	2,500 → 5,000	2.0
• 1 inch	3,000 → 6,000	2.0
• 1 1/4 inch	5,000 → 9,000	1.8
• 1 1/2 inch	7,500 → 12,000	1.6
• 2 inch	15,000 → 20,000	1.3
• 8 inch	50,000 → 70,000	1.4

• FY 2016-2017		
- Expenditure	5,236 million Kyat	3.4
- Revenue	1,527 million Kyat	
- Deficit	3,708 million Kyat	

3.1.2 The MCDC has increased the water tariff from the fiscal year 2017-2018, increasing the domestic water tariff by 2.35 times and the Commercial (Medium) by 2.36 times. The FE (Commercial) rate was increased only 1.25 times. Moat Water was doubled for 1" and 3/4" pipes.

3.1.3 A comparison of water tariffs between YCDC (EDWS) and MCDC is presented as follows:

YCDC Water Tariff Structure			Mandalay Water Tariff Revision		
No.	Category	1 Unit			
1	Domestic (Meter)	88	• Domestic	55 → 85 → 200 /m ³	2.35
2	Commercial (Meter)	110	• Commercial (Medium)	77 → 110 → 260	2.36
3	FE(House) (Meter)	440	• Commercial (Industry/Factory)	440 → 660	1.5
4	FE(Commercial)(Meter)	880	• FE (Commercial)	490 → 880 → 1,100	1.25
5	Y.C.D.C Staff (Meter)	88	-----		
6	Department (Domestic) (Meter)	88	• Moat Water (fixed according to pipe sizes)		
7	Department (Commercial) (Meter)	110	• 1/2 inch	1,500 → 4,000	2.7
8	Domestic (Flat)	1800	• 3/4 inch	2,500 → 5,000	2.0
9	Domestic/Commercial (Large House)	3000	• 1 inch	3,000 → 6,000	2.0
10	FE (Flat)	270,000(for 1 month)	• 1 1/4 inch	5,000 → 9,000	1.8
			• 1 1/2 inch	7,500 → 12,000	1.6
			• 2 inch	15,000 → 20,000	1.3
			• 8 inch	50,000 → 70,000	1.4

			• FY 2016-2017		
			- Expenditure	5,236 million Kyat	3.4
			- Revenue	1,527 million Kyat	
			- Deficit	3,708 million Kyat	

3.2. YESC Electricity Rates

3.2.1 YESC Electricity Rates

It also compared with the Yangon Electric Power Corporation, which has the same nature of operation as the Water Supply and Water Supply Authority. YESC's electricity bill in Yangon is free of charge for all consumers, regardless of nationality. The meter maintenance fee is 500 kyats per month for a three-meter house. Industrial Home Power Meter 3 Phase 2000 / - Kyats; Industrial Power Meter 3 Phase (Transformer) 5,000 / - Kyats. YESC charges a two-part tariff system, block rate, and YESC's tariff and bill form are presented below:

Electricity tariff

Residential settlements, temples and churches including the surrounding areas to such settlement pay electricity tariff according to the below table.

Electricity Consumption	Price per unit (kyat/kWh)
The first 100 kWh (1-100 kWh)	35
The next 100 kWh (101-200 kWh)	40
Unit above 200 kWh	50
Meter service fee	500 kyat per month

Commercial sector and foreigners have the different tariff rates.

Commercial sector	Minimum	75 kyat/kWh
	Maximum	150 kyat/kWh.
Foreigners		12 cent/kWh (about 140 kyat)

YESC Electricity Bill Form

Electricity Form (243) Yangon City Electricity Supply Board
Electricity Bill

Town ship Dec, 2014

Name of Resident Last date for payment

Address of resident 17-Jan-15

Power will be cut after the date

Account No.	18/09/20	Meter No. (F-69638)	Rate	Amt (Kyat)
Rate	1	1 unit to 100 unit	(35 Kyat)	3,500
Meter reading date	1/1/2015	101 unit to 200 unit	(40 Kyat)	4,000
Last month reading	61875	201 unit and above	(50 Kyat)	19,500
Current month reading	62465			
Unit different	590			
Multiplier				
Adding		Total electricity bill		27,000
Unit used	590	Meter service charges		500
Horse power		Horse power charges		
Invoice no. 1022		Total amount		27,500

Township office Phones for complaint - 095503190, 095412538, 01578420

Signature of
Township Administrator

လွှဲပေးရန် (၂၄၃) ရန်ကင်းမြို့နယ်လျှပ်စစ်ဓာတ်အားပေးရေးကော်ပိုရေးရှင်း

ဓာတ်အားပေးကော်ပိုရေးရှင်း

Dec, 2014

Last date for payment

17 Jan 2015

Power will be cut after the date

စာရင်းအမှတ်	18/09/20	မီတာအမှတ် (F-69638)	နှုန်းထား	သက်သေခံ
နှုန်း	1	1 ယူနစ် ၁၀၀ ယူနစ်ထိ	(၃၅ ကျပ်)	၃,၅၀၀
မီတာဖတ်ရက်စွဲ	01/01/2015	၁၀၁ ယူနစ်မှ ၂၀၀ ယူနစ်ထိ	(၄၀ ကျပ်)	၄,၀၀၀
မီတာဖတ်ရက်စွဲ	၆၁၈၇၅	၂၀၁ ယူနစ်မှ အထက်	(၅၀ ကျပ်)	၁၉,၅၀၀
လျှပ်စစ်အသုံး	၆၂၄၆၅			
ယူနစ်ပြောင်း	၅၉၀			
ပေါင်းစပ်		စာရင်းအမှတ်		၂၇,၀၀၀
ယူနစ်အသုံး	၅၉၀	မီတာဝန်ခံခွန်		၅၀၀
မာ့စွမ်းစွမ်း		မာ့စွမ်းစွမ်းခွန်		
စာရင်းအမှတ်	1022	စာရင်းအမှတ်		၂၇,၅၀၀

မြို့နယ်ရုံးဖုန်းအမှတ် - 095503190, 095412538, 01578420

မြို့နယ်အုပ်ချုပ်ရေးမှူး

3.2.2. YESC collects meter maintenance fee according to customer class, such as 3-meter, 3-phase, 3-phase (Transformer). Even if there is no meter unit, the meter bill is issued monthly and only the meter maintenance fee is included, and a fine will be imposed if the meter maintenance fee is not paid within the due date. Regular monthly meter maintenance fees and precise penalties have been found to support YESC's financial growth in one way or another.

3.2.3. At EDWS, the meter maintenance fee is not charged according to the customer class, but only 100 Kyats / - and if it is considered as a suspension bill for various reasons, the bill can be lost due to the suspension of the bill. EDWS meter maintenance fee

3.2.4 Public announcement to increase electricity tariff

Adjusting electricity tariffs

1. Ministry of Electricity and Energy To continue to provide electricity to the areas that have not yet received electricity from the grid system, and to continuously improve the power generation capacity. In order to make more efforts, we have met with representatives and organizations from various fields representing consumers to get suggestions on how to adjust the tariffs.

2. Ministry of Electricity and Energy In accordance with Section 41 of the Electricity Law, the matter of adjusting the electricity tariff was submitted to the Union Government in accordance with the agreement of the Union Government Meeting No. (7/2019) held on 11 April 2019. Starting from 1 July, the electricity tariffs will be adjusted as follows:

Type of Consumers	New Rates (July 2019)		Former Rates		raise ratio
	Unit	Rate	Unit	Rate	
Domestic	1-30	35	1-100	35	----
	31-50	50			43%
	51-75	70			100%
	76-100	90			157%
	101-150	110	101-200	40	175%
	151-200	120			200%
	Over 201	125	Over 201	50	150%
Non-Domestic	1-500	125	1-5,000	75	67%
	501-5,000	135			80%
	5,001-10,000	145	5,001-10,000	100	45%

	10,001-20,000	155	10,001-50,000	125	24%
	20,001-50,000	165			32%
	50,001-100,000	175	50,001-200,000	150	17%
	Over 100,001	180	200,001-300,000	125	44%
			Over 300,001	100	80%

The below rationale for electricity hike, which are compiled from the articles at GNLM (Global New Light of Myanmar) on 14th, 15th, 17th and 20th July 2019, shall be learned in order to review the water tariff rate of YCDC.

- Financial “losses” that have been long incurred by the Electricity Supply Enterprises.
- Electricity supply has been heavily “subsidized” by the State Budget.
- High subsidies is a “legacy” from the Socialist era.
- In a democratic country with a free market economy, a more “market-oriented” outlook is needed.
- In Myanmar need for electricity has been increasing rapidly. To provide adequate electricity is a top priority.
- Electricity generation, transmission and distribution over large areas need huge amounts of investment.
- Union government does not have the funds to undertake such investments.
- Need to invite private sector electricity companies.
- Commercially viable electricity rate shall be introduced as “incentive” for private providers.
- Hikes could be justified if the results improve service of supplying more stable electricity to the present users and at the same time enable to expand supplying to over half of the population who do not yet access to electricity.
- We cannot hear the voices of the people who have no electricity. They cannot accept the benefits of subsidies for electricity costs.
- Electricity rate hike enable more fellow citizens to get access to electricity in the future.
- Increasing rate system: the bigger the users, the more they should pay. “Big users”, “guzzlers” of electricity may save electricity consumption by using other sources.
- As for “industry” sufficient and stable electricity supply will be able to put aside standby-

generators and voltage-regulators in the future.

3.2.5. Electricity tariffs specified in electricity laws and regulations

Rules and standards for determination

The Ministry of Electric Power enacts the regulation with the approval of the Union Government under Section 72 (a) of the Electricity Law. (1377 October 27, 2015 Warning No. 1998/2015 for Electricity Rates

With regard to water supply, this policy is in line with water tariffs.

The principles set electricity rates

87. Electricity tariffs should be based on the following:

(A) Covering all the costs incurred by the permit holders by paying attention to the needs of the electricity consumers.

(B) The rate of return on capital investment in the electricity sector is as high as similar ventures.

(C) Short run and long run marginal costs; Accurate pricing information; Transparency of electricity demand and supply conditions

(D) Electricity tariffs are commensurate with the quality of electricity supplied to each type of consumer and the provision of other electrical services.

(E) according to the various times such as the maximum load time, the time of normal use, etc. Providing services according to the amount of electricity consumption.

(F) The government needs to support the acceleration of rural electricity supply in accordance with the policies set by the Union Government.

4. Study of Water Prices in other countries

A study of water prices in other countries

In studying the water price structure of other countries, Thailand, The Bangkok Metropolitan Waterworks Authority (MWA), the Phnom Penh Water Supply Authority (PPWSA) in Phnom Penh, Cambodia and the Tokyo Metropolitan Water Work Authority in Tokyo, Japan.

4.1. Water Tariff of Metropolitan Waterworks Authority (Bangkok, Thailand)

4.1.1. Bangkok is located in the Gulf and is prone to seawater intrusion due to high groundwater consumption. Bangkok's land level is dropping by 5mm a year, which poses a risk. MWA urges control of groundwater consumption and urges water conversion. Businesses are no longer allowed in Bangkok, but in other parts of Thailand. As a result, the cost of water was raised in 1999 due to the growing need for capital to expand pipelines and meet future water needs. From 1958 to 1999, MWA's water tariff was increased five times, and the current rate is the same as in 1999. At this rate, MWA is still a very profitable and successful water supply organization.

4.1.2. MWA's water tariff is called Type 1 for Residence. Commerce, Government Agency, State Enterprise and Industry are divided into Type-2 and there are Minimum Charges by Block Rate System. Raw Water Charges are collected from the customer and paid to the Royal Irrigation Department. Bulk sale is 10.50 Bath / Cubic Meter for Type 1 and 13.00 Bath / Cubic Meter for Type 2. The water price rate of MWA is shown in Table (4). The meter maintenance fee is also stated in (5):

Schedule (4) WATER TARIFFS OF MWA (EFFECTIVE DECEMBER 1999)

Type 1 Residence		Type 2 Commerce, Government Agency, State Enterprise and Industry	
Volume (cu.m.)	Baht/ cu.m.	Volume (cu.m.)	Baht/ cu.m.
1-30	8.50 Not less than 45.00 Baht	0-10	9.50 Not less than 90.00 Baht
31-40	10.03	11-20	10.70
41-50	10.35	21-30	10.95
51-60	10.68	31-40	13.21
61-70	11.00	41-50	13.54
71-80	11.33	51-60	13.86

81-90	12.50	61-80	14.19
91-100	12.82	81-100	14.51
101-120	13.15	101-120	14.84
121-160	13.47	121-160	15.16
161-200	13.80	161-200	15.49
Over 200	14.45	Over 200	15.81

MWA has been charged the untreated water at the rate of 0.15 baht or 15 satang/cubic meter to the Royal Irrigation Department.

Note:

1. Value added tax is not included.

2. Bulk sale:

Type 1 = 10.50 Baht/cubic meter;

Type 2 = 13.00 Baht/cubic meter

Table (5) MWA meter maintenance fee

Diameter	Baht
½	25
¾	40
1	50
1 ½	80
2	300
3	400
4	500
6	900
8	1100
12	3500
16	5000

4.1.3. MWA rates are set for the new water connection as shown in Table 6 below:

Table 6 The cost of the new water connection of MWA


Meter Size (inch)	Type R2		Service Fee	Cost Collect 7%vat not Included	Guarantee Deposit		
	Volume (cu.m.)	Baht(cu.m)			Perma- nent	Contempo- rary R1	Contempo- rary R2
0-1/2"	0-10	90	25	5000	400	2000	5000
1-3/4"	0-10	90	40	6000	600	3000	7000
2-1"	Less than 50	579	50	8000	1500	5000	12500
4-1½"	Less than 120	1588.40	80	12000	3000	-	30000
5-2"	Less than 200	2814.40	300	36000	4000	-	50000
7-3"	Less than 450	6766.90	400	71000	10000	-	50000
8-4"	Less than 800	12300.40	500	92000	15000	-	50000
A-6"	Less than 1800	28110.40	900	150000	20000	-	50000
B-8"	Less than 3200	50244.40	1100	210000	30000	-	50000
D-12"	Less than 54000	85026.40	3500	430000	-	-	-
H-16"	Less than 12800	202020.40	5000	680000	-	-	-

4.1.4. For MWA, the cleaning fee is set according to the following table (7):

Table 7 Tank cleaning service fee

Capacity of tank (cu.m.)	Service rate(Baht)
3	1500
10	3200
20	4800
30	6100
40	7300
50	8300
70	10200
90	11800
110	13300
140	15400
170	17300
200	19100
250	21800
300	24400
500	33100
600	36900

4.1.5. MWA collects Service Fee, Guarantee Deposit and Value Added Tax 7% per meter for water connection. It was found that 7% Value Added Tax was collected from customers and charged 0.15 Bath per unit of Raw Water Charges. MWA's water bill is as follows:


การประปานครหลวง ใบแจ้งค่าน้ำประปา
<http://www.mwa.co.th> E-mail : mwa1125@mwa.co.th
 สาขาบางบัวทอง 02-5713982-7 ประจำเดือน 11/59

สาขา-เขต	ทะเบียนผู้ใช้น้ำ	เส้นทาง-ลำดับ	เลขที่แจ้งค่าน้ำ	วันที่แจ้งค่าน้ำ
54-02	47347315	532-040	582457-8	15/11/59 07:11
วันที่อ่านครั้งนี้	เลขในมาตร	วันที่อ่านครั้งก่อน	เลขในมาตร	จำนวนน้ำใช้
15/11/59	810	15/10/59	803	7

ค่าน้ำดิบ (ลูกบาศก์เมตรละ.....0.15.....บาท)	1.05	<i>Raw Water Unit Ch</i> <i>Service C</i> <i>Total.</i> <i>Tax 7%.</i> <i>Total</i>
ค่าน้ำประปา R1(00)	59.50	
ส่วนลด	0.00	
ค่าบริการรายเดือน	40.00	
ยอดเงินก่อนคิดภาษี	100.55	
ภาษีมูลค่าเพิ่ม 7%	7.04	
รวมเงิน	107.59	
ค่าน้ำเดือนก่อน.....0.....เดือน	0.00	
รวมเงินที่ต้องชำระทั้งสิ้น	*****107.59	
โปรด.....ชำระเงินภายใน.....วันที่	22/11/59	

ประวัติการใช้น้ำประปาย้อนหลัง 3 เดือน

วันที่อ่านน้ำ	15/08/59	15/09/59	15/10/59
จำนวนน้ำใช้	5	4	3

โปรดระวังบุคคลแอบอ้างเก็บเงินค่าน้ำประปา

V. 34.00

ชื่อผู้ใช้น้ำ นายไพฑูรย์ □ พัฒนผล
 ที่ใช้น้ำ 69/23 ม.2 ม.ล.ภาวัน ค.10 ต.บางพลับ อ.ปากเกร็ด
 นนทบุรี 11120

4.2. Water Tariff of Phnom Penh Water Supply Authority (PPWSA), Cambodia

PPWSA has been collecting water tariffs since 1984 and charges 166 Riels per unit for all utilities. In 1993, the rate was increased to 166 Riel per unit for commercial use and 515 Riel per unit, and was classified as household and commercial. In 1996, the household price was 250 Riel per unit. 700 Riel was collected per commercial unit. In 2001, the water price was renegotiated and the commercial rate was reduced. At this rate, it is still collecting and is still a very profitable and successful water supply organization. The PPWSA water rates are as follows:

PPWSA Water Rates Table

Water Tariff

1984 : 1st Tariff – 166 Riel/m³

1993 : 166 Riel/m³ for Domestic, 515 Riel/m³ for Commercial

1996 : 250 Riel/m³ for Domestic, 700 Riel/m³ for Commercial

1997 : 1st Block Tariff

Consumer Category	Block (m ³ /month)	Tariff (Riels/m ³)
Domestic	0 - 15	300
	16 - 30	620
	31 - 100	940
	>100	1260
Administra	flat rate	940
Commercial & Industrial	<100	940
	101 - 200	1260
	201 - 500	1580
	>500	1900

2001 : 1st Adjustment

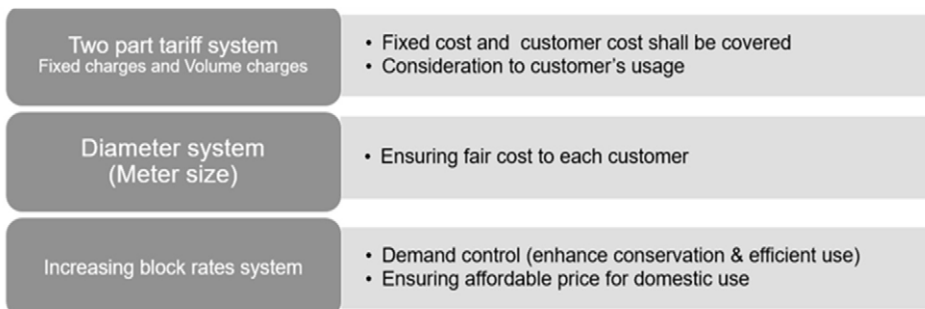
Consumer Category	Block (m ³ /month)	Tariff (Riels/m ³)	Tariff (USD/m ³)
Domestic	0 - 7	550	0.14
	8 - 15	770	0.19
	16 - 50	1010	0.25
	> 50	1270	0.31
Admin.	flat rate	1030	0.25
Commer. & Industrial	<100	950	0.23
	101 - 200	1150	0.28
	201 - 500	1350	0.33
	> 500	1450	0.36

4.3. Water Tariff of Tokyo Metropolitan Waterworks Bureau, Japan

4.3.1. In Tokyo, Japan, the water supply system must comply with the regulations set by the central government and comply with the requirements of the Local Public Enterprise Act and the Local Public Service Act. Local municipalities have the right to manage the water, but only with the approval of the Hluttaw and the will of the people.

4.3.2. Japan's water tariff is a Two Part tariff system (Fixed Charge and Volume Charges) and is charged by the Diameter System according to the meter size. Water bills are charged by the Increasing block rates system. Fixed Charges are paid monthly according to pipe size. Here is Tokyo's Rate Design:

Rate design in Tokyo



Class of charges		Fixed charges ^{←1} yen	Commodity charges (Volume charges) ^{←1}																
			1 m ³ ~ 5 m ³	6 m ³ ~ 10 m ³	11 m ³ ~ 20 m ³	21 m ³ ~ 30 m ³	31 m ³ ~ 50 m ³	51 m ³ ~ 100 m ³	101 m ³ ~ 200 m ³	201 m ³ ~ 1000 m ³	1001 m ³ ~								
General use	13mm	860 yen	0 yen	22 yen per 1m ³	128 yen per 1m ³	163 yen per 1m ³	202 yen per 1m ³	213 yen per 1m ³	298 yen per 1m ³	372 yen per 1m ³	404 yen per 1m ³								
	20mm	1,170 yen		22 yen per 1m ³	128 yen per 1m ³	163 yen per 1m ³	202 yen per 1m ³	213 yen per 1m ³	298 yen per 1m ³	372 yen per 1m ³	404 yen per 1m ³								
	25mm	1,460 yen		22 yen per 1m ³	128 yen per 1m ³	163 yen per 1m ³	202 yen per 1m ³	213 yen per 1m ³	298 yen per 1m ³	372 yen per 1m ³	404 yen per 1m ³								
	30mm	3,435 yen	213 yen per 1m ³						298 yen per 1m ³	372 yen per 1m ³	404 yen per 1m ³								
	40mm	6,865 yen	213 yen per 1m ³						298 yen per 1m ³	372 yen per 1m ³	404 yen per 1m ³								
	50mm	20,720 yen	372 yen per 1m ³								404 yen per 1m ³								
	75mm	45,623 yen	372 yen per 1m ³								404 yen per 1m ³								
	100mm	94,568 yen	404 yen per 1m ³																
	150mm	159,094 yen																	
	200mm	349,434 yen																	
250mm	480,135 yen																		
300mm or more	816,145 yen	404 yen per 1m ³																	
Public bath use											Is same as the general use up to 30mm, 6,865 yen for 40mm or more	0 yen	22 yen per 1m ³	109 yen per 1m ³					
												0 yen	22 yen per 1m ³	109 yen per 1m ³					
												0 yen	22 yen per 1m ³	109 yen per 1m ³					
		0 yen	22 yen per 1m ³	109 yen per 1m ³															

4.4. Summary of other countries water tariff

In MWA (Thailand), PPWSA (Cambodia), Tokyo (Japan), a deposit is charged for fixed maintenance charges and a water connection fee. These deposits provide one-way capital for the water supply business. The collection of water tariffs by the Increasing Block Rate System is also a good way to prevent water scarcity in one way or another. These countries are highly profitable and successful organizations in the field of water tariffs, which were set more than 10 years ago, and should be emulated as a model for changing EDWS tariffs, which have many disadvantages.

5. Study Guidelines / manuals of other countries

The following guidelines from other countries: The YCDC's Guidelines for Increasing / Reducing Water Bills will be developed and submitted.

5.1. "Guidelines for water tariff setting" by Japan Water Works Association

Japan Water Works Association: Guidelines for Water Tariff Setting

First Edition: July, 1967
Revised: August, 1979
Revised: October, 1997
Revised: February, 2015

1. General Provisions
 - (1) Objective
2. Revenue Requirements
 - (1) Basic Concept
 - (2) Period of Calculation of Water Tariff
 - (3) Operational Cost
 - a. Personnel Cost
 - b. Chemical Cost
 - c. Electricity Cost
 - d. Repair Cost
 - e. Water Receiving Cost
 - f. Depreciation Cost
 - g. Asset Diminishing Cost
 - h. Other Operation & Maintenance Cost
 - i. Item of Deduction
 - (4) Capital Cost
 - a. Interest Cost
 - b. Asset Maintenance Cost
 - (5) Management Improvement Planning
3. Water Tariff Structure
 - (1) General Provisions
 - a. Individual Cost of Service Principle
 - b. Special Measures.....3
 - (2) Transitional Measures Adapting New Guideline

1. General Provisions

(1) Objective

Determination of water tariff shall be made by considering benefit and fairness for the valued customers and for development of the water supply services, and also deem to contribute to health/welfare of people in which water supply services (enterprise) are operating the business.

2. Revenue Requirements

(1) Basic Concept

Water tariff shall be determined by considering feasible forecast of water demand and facility planning to fulfill the demand based on the actual results in the past and economic and social conditions of the country/province. The water tariff includes operating cost and capital cost in order to assure sustainable healthy management of the water supply services (enterprise). Further more, external works such as entrusted construction including direct and indirect cost for both income and expense shall balance equally and compensate each other.

(2) Period of Calculation of Water Tariff

Period of water tariff determination will be between 3 and 5 years and plan as long as feasible periods.

(3) Operating Cost

Operating cost comprises the summation of personnel cost, chemical cost, electrical cost, repair cost, water receiving cost, depreciation cost, asset diminishing cost, other O/M cost and exclude deducting items.

Estimation of the each cost and deducting items are carefully made by considering water supply service planning and economic/social trend and conditions for the period of the water tariff calculation.

a. Personnel cost

Personnel cost comprises the summation of salary, allowances, wages, reward, legal welfare cost, retirement allowance and will be calculated properly by considering the actual results in the past, staff planning and increment of the aforementioned salary. Calculation of the retirement allowance will be made in accordance with the age structure of the staff.

b. Chemical Cost

Chemical cost will be calculated properly in accordance with the water supply planning and raw water quality of each raw water resources which will affect the unit process of raw water treatment method.

c. Electrical Cost

Electrical cost will be calculated properly in accordance with the individual operating plan of facilities which is based on the estimation of each block water demand.

d. Repair Cost

Repair cost will be calculated properly by considering actual results in the past and characteristic of water supply services (enterprise) and regional conditions in order to operate and maintain the water supply facilities in good conditions.

e. Water Receiving Cost

Water receiving cost will be properly calculated in accordance with the water receiving planning.

f. Depreciation Cost

Depreciation cost will be calculated principally by applying the straight line depreciation method to the book value of the assets which will be included in the calculation of the water tariff for the target periods.

g. Asset Diminishing Cost

Asset diminishing cost will be calculated by considering the actual results in the past and conditions of the existing water supply facilities.

h. Other Operation and Maintenance Cost

Other operation and maintenance cost such as communication and transportation cost, trustee income, commission will be calculated properly by considering the actual results in the past, future water supply planning, special characteristic of the individual cost and condition of the existing water supply facilities.

i. Deduction Items

Deduction items which the revenue come from commission related to the other operation of the water supply will be calculated properly by considering the actual results in the past and future water supply planning.

(4) Capital Cost

Capital cost comprises the summation of interest cost and asset maintenance cost which is necessary to maintain all water supply facilities and expansion of the facilities to meet the demand of the valued customers in the future.

a. Interest Cost

Interest cost comprises the summation of interest for corporate bond, commission, issued differential depreciation cost (prepaid expense) and interest of temporary borrowed money. And external revenue related receivable interest will be excluded from the interest cost.

b. Asset Maintenance Cost

Asset maintenance cost will be calculated by multiplying the all assets which are necessary to operate/maintain and reasonable percentage against the book value of the all assets in order to use the budget to support the existing operating cost and capital cost and expansion/rehabilitation of the facilities to meet demand of the valued customers in the future and redemption of the corporate bond.

(5) Management Improvement Planning

When calculation of the water tariff is made, we should review and evaluate the present management procedures regarding all water supply services and make management improvement planning in order to reflect the results of the evaluation to the revenue requirements

3. Water Tariff System

(1) General Provisions

a. Individual Cost Basis Concept

Water tariff will be determined to classify into the basic charge and the usage charge based on allocation of the revenue requirements to each customers group in accordance with individual cost basis. In this case, total income/revenue calculated by utilizing the determined water tariff should be equal to the revenue requirements

b. Special Measures

- (a) When special consideration/measures will be necessary for the basic charge of each customer group regarding basic human needs (BHN) and/or actual conditions of water supply demand, a part of capital cost could not be allocated to the basic charge and decrease burden of the special customer groups.
- (b) Usage charge could be allocated in decreased and/or increased tariff based on the classification of customer groups in accordance with actual condition of water supply demand.

5.2. "Manual 1: Principles of Water Rates, Fees, and Charges" by AWWA

AWWA Manual No. 1 Principles of Water Rates, Fees and Charges (5th Edition)

Section 1: Revenue Requirements

- Chapter 1 General Concepts
- Chapter 2 Revenue
- Chapter 3 Operation and Maintenance Expenses
- Chapter 4 Taxes
- Chapter 5 Capital-Related Costs
- Chapter 6 Example of Revenue Requirements

Section 2: Cost Allocation

- Chapter 7 Allocating Costs of Service Cost Components
- Chapter 8 Distributing Costs to Customer Classes

Section 3 Rate Design

- Chapter 9 Selecting Rate Structures
- Chapter 10 Uniform Rates
- Chapter 11 Declining Block Rates
- Chapter 12 Increasing Block Rates
- Chapter 13 Seasonal Rates
- Chapter 14 Fixed Versus Variable Charges
- Chapter 15 Marginal Cost Pricing

Section 4: Consumer-Specific Charges

- Chapter 16 Low-Income Affordability Rates
- Chapter 17 Negotiated Contract Rates
- Chapter 18 Economic Development Rates
- Chapter 19 Standby Rates

Section 5 Alternative Rates

- Chapter 20 Demand-Side Management
- Chapter 21 Price Elasticity
- Chapter 22 Value-of-Service Pricing
- Chapter 23 Drought Pricing
- Chapter 24 Rate Surcharges
- Chapter 25 Indexed Rates

Section 6: Capacity and Development Charges

- Chapter 26 Connection and Customer Facility Fees
- Chapter 27 Policies and Procedures for Water Service Extension
- Chapter 28 System Development Charges
- Chapter 29 Dedicated-Capacity Charges

Section 7 Fire Protection Charges

- Chapter 30 Rates for Fire Protection Service

Section 8 Wholesale Rates

- Chapter 31 Wholesale Rates

Section 9 Miscellaneous and Special Charges

- Chapter 32 Miscellaneous and Special Charges

Section 10 Implementation Issues

- Chapter 33 Public Involvement Definition
- Chapter 34 Legal Considerations
- Chapter 35 Data Requirements

Appendixes

- (A) Development of Capacity Factors by Customer Class
- (B) Equivalent Meter Ratios
- (C) Billing Tabulation Methodology
- (D) Example of Citizens Advisory Committee Guidelines

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5.3. “Manual 54: Developing Rates for Small Systems” by American Water Works Association

Chapter 1 Customer Account and Usage Data

Chapter 2 Preparing a Financial Plan

Chapter 3 Determining a Pattern of Revenue Increases and Test-Year Revenue Requirements

Chapter 4 Rate Design

Chapter 5 Special Considerations

5.4. “Guidelines for User Fees and Cost Recovery” by African Development Bank’s

African Development Bank

Guidelines for User Fees and Cost Recovery (for Urban Water and Sanitation)

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1 Step one: Determining the Economic, Policy and Institutional Environment

2 Step two: Setting Cost Recovery and Service Objectives

3 Step three:

3.1 Determining Revenue Requirements

3.2 Calculating Average User Fees

3.3 Future Costs for Sustainability

3.4 Support to Revenue through Societal Contributions (Subsidies)

4 Step four: The Basis for Charging User Fees

5 Step five: Implementation of User Fees and Cost Recovery System

5.5. “Manual on Water Rates” by LWUA (Local Water Utilities Administration), Philippine

Chapter 1 Requisites of Water Rates

Chapter 2 Basic Guide to Water Rates

Chapter 3 Basic Connection Charges

Chapter 4 Development of Water Rates

Chapter 5 Computation of Water Rates

Chapter 6 Cash flow Projection

Chapter 7 Adjustment of Water Rates

Chapter 8 Public Hearing for Water Rate Increase

Chapter 9 Review of Water Rates

II Draft Guidelines for Water Tariff Setting in YCDC

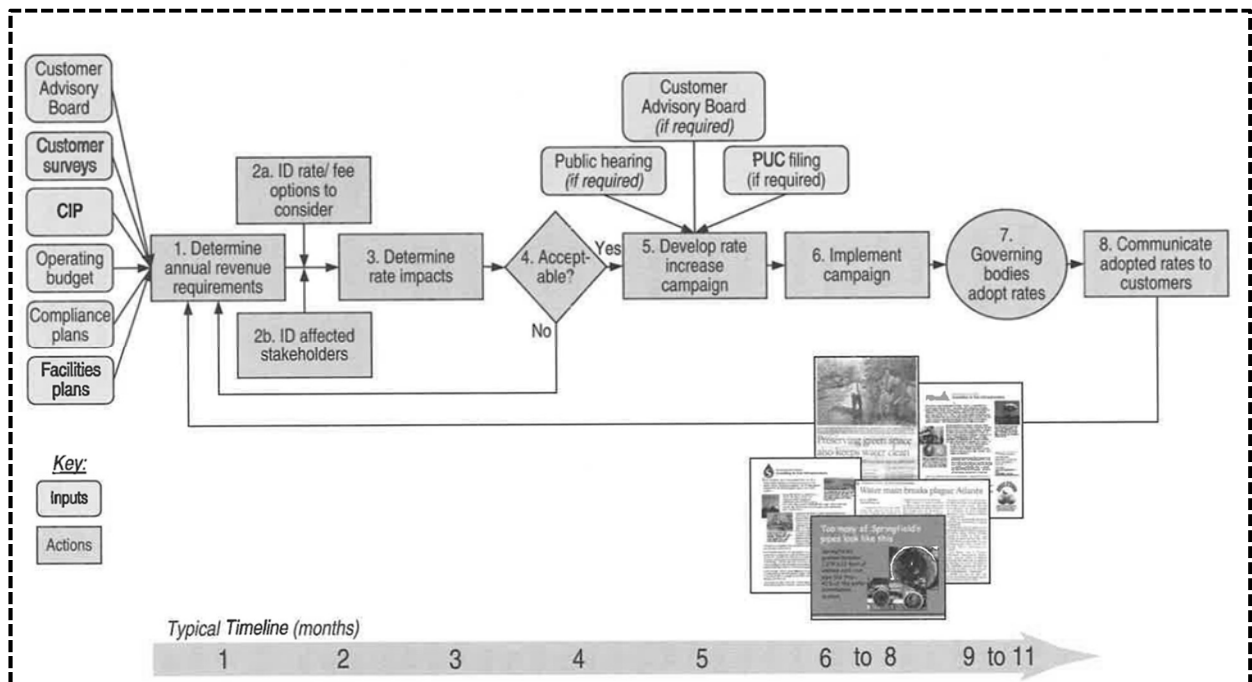
1. Process

1.1. New Tariff Decision Process

Water tariff is usually decided by Parliament or Committee which represent customers or citizens who pay water tariff. Following diagram is a typical decision process of water tariff in USA where governing bodies (parliament or committee) decide after several deliberate processes.

In Japan where municipal government manage water supply utility, local parliament is the final decision maker of water tariff.

In Yangon, the draft of tariff revision plan shall be made by EDWS. Then it is to be discussed in YCDC and proposed to Yangon Regional Government and be decided there. The Union Government of Myanmar shall concern about it from time to time.

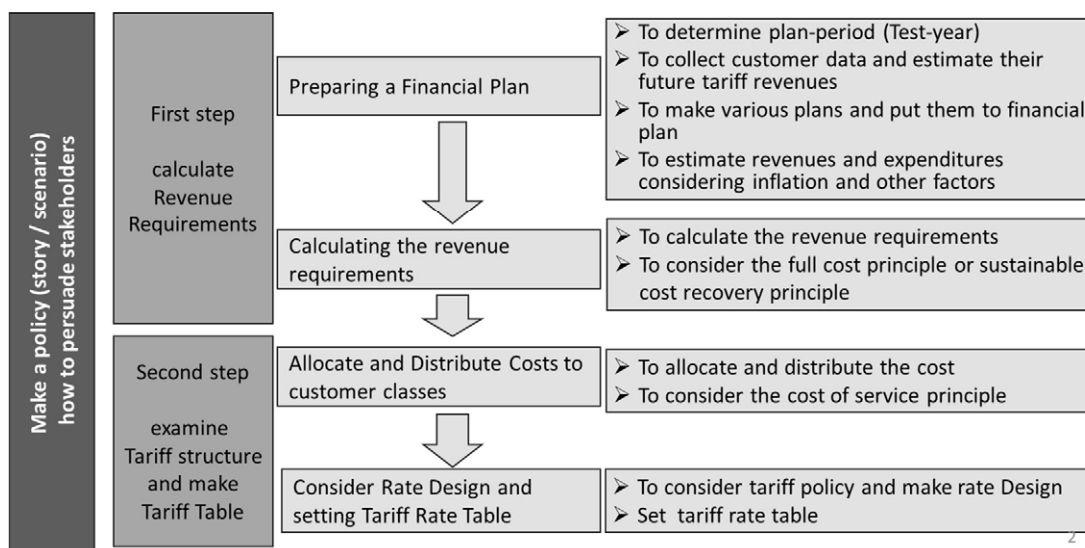


(Avoiding Rate Shock by AWWA April 2004)

1.2. New Tariff Drafting Process

The widening income-expenditure ratio at EDWS is widening with the implementation of new water supply projects; Obtaining foreign loans; EDWS's water tariffs must be increased due to the fact that the water tariff is too low. Customers who use water and stakeholders must be prepared to explain the reasons and information needed to increase water rates. Financial plans are being drawn up for the systematic increase in water tariffs. Developing Water Tariff Setting Guidelines has become a must.

Process of water tariff setting



EDWS 'current water tariffs are inconsistent with the cost of annual water revenues, which are very low compared to neighboring countries. About 20% of customers only pay flat rate water. In terms of water supply, there is a difference between part-time water supply and 24-hour water supply, but the water tariff rate should be reconsidered. The difference between commercial water rates and domestic water rates must also be carefully weighed. Household customers have a large number but low water consumption. Commercial customers, on the other hand, have smaller but larger water consumption. Therefore, we have to rely more on commercial connection when it comes to water tariffs. It is important to carefully consider the rates for home and commercial water.

It is better to set a block rate than a uniform rate and prevent water wastage in one way or another. Collecting water bills with the Minimum Charges system can increase the revenue of the water supply and reduce the need for capital. For general maintenance procedures, a monthly system of fixed-rate rates is a good way to increase the revenue ratio of the water supply.

However, if the water supply is to implement the Water Tariff Setting Guideline to increase water

tariffs, a reasonable water tariff must be considered after considering all the issues facing customers in their daily lives. Only then will the financial position of the water supply be strong and the water supply process will continue to grow. The Process of Water Tariff Setting for Water Tariff Setting Guideline is as follows:

The first step in this process is to calculate the Revenue Requirements. To do so, you need to prepare financial plans in advance. To write a financial plan, you must first set a plan period. Plan Periods are usually drawn up over a five-year period, after which customer data is collected and future revenue estimates are estimated. Different financial plans need to be prepared for different situations. In estimating revenue and expenditure, factors such as inflation and various factors that could affect the financial plan should be taken into account. After careful consideration, the Revenue Requirement must be calculated. When calculating revenue requirements, it is important to consider which approach to approach, the Full Cost Principle and the Sustainable Cost Recovery principle.

The second step is to Allocate and Distribute Costs according to Customer Class. The cost of service principle must be considered here. Then consider the Tariff Policy Design and Setting Rate Table.

Two steps of Water Tariff Setting Considerations for business and home enhancement

In the first step, a financial plan must be drawn up. Calculating income requirements; The government has decided to increase the water tariff by an average of 20% or 30%, based on the amount of government funding available and the deficit.

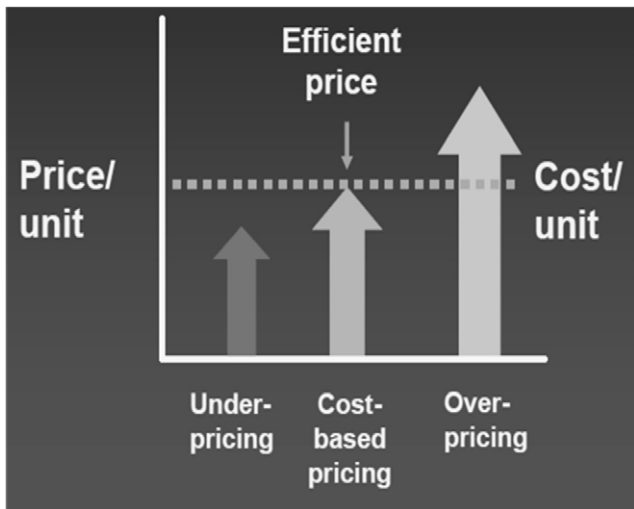
First step: Financial Plan □ Revenue Requirement

Second step: Cost Analysis □ Rate Design

The second step is to consider the% increase for each user class to balance the water user class. Water consumption by class of water users; Finding out the cost components; Establish a policy and rate design to ensure a fair price.

EDWS Setting Rate at Cost is presented with the following graph:

Setting Rate at Cost



Full cost recovery principle

- total cost = total revenue

EDWS can be considered as a Full Cost Recovery only if all total costs are recovered from Total Revenue. EDWS is subject to Under Pricing Level. Price Unit = Cost Unit Level. The Over Pricing Level is a profitable rate that covers costs. Therefore, step by step measures must be taken to systematically increase water tariffs.

1.3 New Tariff Consulting Process

1.3 Working with advisory groups for new water tariffs:

Expert advice is needed to change the water tariff. The mayor and department heads need to make the financial situation of the water supply system public from time to time.

Current water charges lower than production cost: Yangon Mayor

(Global New Light of Myanmar, 8 August 2019, By Nyein Nyein)

THE current rates for water supply do not cover production costs, said Yangon Mayor U Maung Maung Soe at a recent press conference on the Yangon City Development Committee (YCDC).

The calculations for water meter bills must include charges for laying the pipe network and the water distribution cost, he said. At present, the bills do not even cover the cost of distribution, he added.

“If we compare the water meter rates with the distribution cost, the existing bills are much lower than that, excluding the cost of machines. This being so, the government is making a loss on running this, like power supply,” said U Maung Maung Soe.

However, there is no plan yet to hike the water charges up for now, he said. At present, the Yangon authorities are raising awareness about systematic water meter installation, dealing with water pipe leakages, unsystematic water consumption, management of water loss in urban water distribution, and curbing illegal connections to the water pipe network, said U Maung Maung Soe. Currently, the rates for water are K88 per unit (220 gallons) for households and K120 per unit for businesses. The Gyophyu, Phoo Gyi, and Nga Moe Yeik reservoirs are the main sources of water supply in Yangon at present, providing over 2 million gallons of water every day.

To expand the water distribution network, projects are under way at Lagunpyin and Kokkowa, which aim to cover 90 per cent of the region’s population by 2025, according to the YCDC.

In addition, the YCDC is creating water supply resources to provide adequate drinking water to Yangonites, and is taking measures to reduce wastage in urban water distribution, with the

In Japan, an advisory committee has been set up to examine water tariffs and consult with the public to seek advice from water users.

Discussion by advisory committee & public consultations

An advisory committee is established to examine the tariff system and public consultations are held to seek customers input.

Advisory committee ensures:

1. accountability and information disclosure (utility has to make the case for revision);
2. objectivity in the decision-making process;
3. use of expert advice from members;
4. incorporation of customers’ inputs from representatives in the committee.



Advisory committee on waterworks management in Koriyama City

Source: <https://www.city.koriyama.fukushima.jp/481000/jogesuido/shingikai.html>

Ministry to brief MPs on power rate hikes

The rate hikes were determined after a five-stage process

1. Discussions were held with the electrification affairs committees in the Pyithu Hluttaw (Lower House) and Amyotha Hluttaw (Upper House).
2. Also, state and regional officials in charge of power and electricity were asked for their input.
3. The third stage involved talks with the private sector, represented by the Union of Myanmar Federation of Chambers of Commerce and Industry.
4. A comprehensive report on the rate hikes was then submitted to parliament.
5. The final stage involved seeking the advice of international organisations.

1.4 Public awareness for new tariff

Ministry of Electricity and Energy announces to the public about the change in electricity tariff

Public Announcement from Ministry of Electricity and Energy changes to electricity rates


1. THE Ministry of Electricity and Energy held a meeting with representatives of the public and organizations from different areas to discuss and elicit suggestions related to amending the rates of electricity consumption to a more suitable rate. This is aimed to support the long-term development of electric production and distribution through expansion projects, connecting non-electrified regions to the main power grid or an alternative energy source, continuously improving electric production, and increasing work processes.
2. In accordance with Section 41 of the Electricity Law (2014), the Ministry submitted a proposal to amend electricity rates to the Union Government, who gave their approval during their meeting No. (7/2019) held on 11 April 2019. With permission from the Union Government, the electricity rates across Myanmar will be amended to the following rates, outlined in the table, beginning from 1 July 2019:

One of Japan's case is shown as followings. They try to explain simply with illustration in the aged society.


Japan's case is shown as followings:

Public notification


The public is informed of the new tariffs.



Diameter of pipe **20mm**



Use of **20m³** /monthly



Monthly water tariff (excluding consumption tax, etc.)

(Present) April, 2015	(Revised) April, 2016	(Revised) April, 2017
1,915 JPY	2,060 JPY	2,140 JPY

+ 145 JPY + 80 JPY

Source: Suita City, <http://www.city.suita.osaka.jp/var/rev0/0096/0282/11641310928.pdf>

2. Financial Plan

2.1. Duration of test year

(1) The Plan Period must be clearly defined when drawing up the Plan. Data from water users will be collected and future water revenue revenues will be calculated. Three-year plan; A five-year plan must be drawn up. The plan includes other factors that may arise due to inflation; Revenues and expenditures must be estimated.

Developing the First Step

2.2. Estimation methods for expenditure and income

Income requirements include the calculation of income requirements to cover all costs and income requirements to cover the cost of each expense. Following boxed explanation is an example of estimation method which is published by Japan Water Works Association. (JWWA)

(1) Operating Cost

Calculation of operating cost will be made by considering the necessity of the efficient management of the water supply services (enterprise) and integrated water supply services (enterprise) planning and trend of the economic conditions. Furthermore, the integrated management of the water supply services (enterprise) shall include overall water supply programme, expansion/rehabilitation of water supply facility planning, financial planning, repair planning and staff planning. And economic trend will mainly mean the trend of the personnel cost and commodity prices.

Operating cost comprises the summation of personnel cost, chemical cost, electrical cost, repair cost, water receiving cost, depreciation cost, asset diminishing cost, other O/M cost and exclude deducting items.

Estimation of the each cost and deducting items are carefully made by considering water supply service planning and economic/social trend and conditions for the period of the water tariff calculation. <JWWA>

(a) Personnel Cost

Personnel cost will be the summation of salary, allowances, wages, reward, legal welfare cost, retirement allowance of which will be calculated by multiplying the average required personnel cost of the all staffs and number of the staffs for the period of the water tariff calculation. Estimation of the required staff will be determined in accordance with each divisional work load by considering the economic efficiency and effectiveness of the division.

The average personnel cost per capita will be calculated in accordance with seniority of the staff and annual increase of the rise of the wage base and the actual results in the past corresponding to the economic development. And significant productivity improvement were expected to occur, this will be included in the raise of the wage base as required. Retirement allowance will be calculated based not only on the payable allowance for during the water tariff calculation period but also prerequisite of the reservation fund system for retirement in order to attempt fairness of the burden of the water tariff by the valued customers.

Calculation method of the carried over of the retirement allowance will be properly made as follows;

- i) Supposing that all staff would retire at the end of the water tariff calculation period and got retirement allowance and all staff would have gotten the retirement allowance in the previous year. The difference of the two retirement allowances will become the retirement allowance.
- ii) Assuming that retirement allowance will be calculated for the estimated working year for all staff and allocated them in proportional to the water tariff calculation period. <JWWA>

(b) Chemical Cost

Chemical cost will properly be calculated by multiplying the total water supply volume and the unit chemical cost per 1 cubic meter of the water for the water tariff calculation period.

And if raw water quality is quite difference from each raw water source, then unit cost estimation should be made in accordance with each water resource. Also fluctuation of the chemical price be expected in seasonally, then this factor should be included in the calculation of the chemical cost.

(c) Electrical Cost

Electrical cost will be properly calculated by multiplying the unit cost of the electricity and basic contract charge and usage charge which is estimated based on the individual operating plan of each facility. If other power source will be used except electricity, cost will be calculated in accordance with the above mentioned method. When the revision of the electricity cost would be expected during the water tariff calculation period, this could be considered to calculate the electrical cost accordingly. <JWWA>

(d) Repair Cost

Repair cost will be calculated properly by multiplying the standard coefficient of expense against the acquisition cost of the operating assets (if re-evaluate the assets, use the latest one) and deducting the personnel cost and other cost included in the operating cost from the calculated cost. However, when the calculation of the standard coefficient of the expense will be extremely difficult, repair cost could be calculated by estimating repair cost for each facility taken into the actual experience in the past and/or service life of the component of the facilities.

Herewith, the acquisition cost of the operating assets equal to the deduction of land cost, other not depreciated assets so-called intangible assets from the total acquisition cost of the assets and allocate average cost for each year.

Standard coefficient of the expense will be properly estimated for each facility in order to operate and maintain the existing facilities and estimated based not only on the actual results in the past, but also the characteristic of each facility by considering integrated viewpoint of snow, transportation and other natural/social conditions together. However, when the estimation of the standard coefficient of the expense for each facility will be extremely difficult, fixed percentage of 3 % against the total cost of the operating assets could be used practically.

The same procedures could be used to estimate the standard coefficient of the expense by accumulating method based not only on the actual results in the past, but also the characteristic of each facility by considering integrated viewpoint of snow, transportation and other natural/social conditions together. And it will be better to establish reserve fund system for accounting procedures regarding repair cost. <JWWA>

(e) Water Receiving Cost

Water receiving cost will be properly calculated in accordance with the water receiving planning.

There are two (2) methods to receive water regarding raw water and treated water. First method is to allocate necessary fund to get raw water and treated water and second method is to purchase these water by contracting unit price. Allocation of the fund will be properly calculated based on the benefit of the water supply services and availability of the budget. Purchasing cost of the raw water and treated water will be properly calculated by multiplying the unit price and the estimated receiving volume of water. The receiving volume of water will be properly estimated based on the water supply and demand planning in both methods. <JWWA>

(f) Depreciation Cost

Depreciation cost will be calculated by applying the straight line depreciation method against the acquisition cost of the assets for the water tariff calculation period of the deprecation assets. However, fixed percentage depreciation method (fixed percentage on reducing balance method) could be also used when this method is still used and familiar to the water supply services. The salvage value and durable year of the facilities will be provided by the local public enterprise law (Regulation No. 8, clause 7,8 & 9, 1998, GoJ or).

Pipeline, water meter and house connection will be better processed as replaceable assets in order to maintain and operate the existing assets as sustainable as possible if financial and other conditions are feasible. The depreciation of the replaceable assets which is newly included in the assets will be depreciated until reaching 50 % (50/100) of the acquisition cost.

The total fixed assets including depreciated assets should be evaluated properly based on the services of the concerned assets. The cost required for removing the old facilities, allocation cost for raw and treated water and compensation cost to which will not be related the services of the assets or common administration cost deemed to be expense to get profits will not be included into the acquisition cost of the fixed assets but included into the expense to get profits.

And intangible assets such as land for installation of pipelines, submerged land due to the construction of intake dam will be studied to include the intangible depreciation assets in the future because utilization of the eternal asset of the land will diminish. <JWWA>

(g) Asset Diminishing Cost

Asset diminishing cost will be properly calculated based on the actual results in the past and present conditions of the water supply facilities.

The contents of the asset diminishing cost will be classified into two major items such as deduction cost and inventories. The former will be estimated in the long term so that deduction cost will proportionally change to the capacity of the water supply facilities, and the later will be estimated and calculated for the annual proper inventories based on the actual results in the past and water supply services (enterprise) planning, except special reasons be occurred. <JWWA>

(h) Other Operation/Maintenance Cost

Operating cost such as communication/transportation cost and trustee/commission fee which will not be included in the items mentioned above from (a) to (g) will be calculated properly by multiplying the appropriate unit price and/or adequate coefficient against the other administration cost which is calculated by each item of the water supply services (enterprise).

Quantity and size of the related to the each cost will be estimated properly based on the actual results in the past and overall panning of the water supply services (enterprise). Minimum inflation or deflation rate should be included to calculate unit price of the operating cost, taken into account the economic trend. <JWWA>

Item of Deduction

Deduction items which the revenue come from commission related to the other operation of the water supply will be calculated properly by multiplying unit price or ratio of revenue against the volume of the works or characteristic and size of the works.

Estimation of volume, size, unit price and ratio of revenue will be carefully made based on the actual results in the past and overall water supply planning and trend of the economy. <JWWA>

(2) Capital Cost

Capital cost comprises of the summation of the interest cost and the asset maintenance cost.

There are usually two (2) methods to calculate the capital cost, that is, rate base method and accumulate cost method. The rate base method deems to be reasonable because it will be possible to raise internal fund to keep profit rate balance with another company but also assure the standardization of the water tariff and promote improvement of the management of the water supply services (enterprise) together.

However, calculation of the capital cost based on the asset benchmarking (base rate method) will be difficult for the time being due to limitation of procedures of fund raising. Therefore, capital cost comprises of the summation of the interest cost and asset maintenance cost as calculated by the accumulation method and asset maintenance cost will be calculated by making full use of the advantage of the rate base method. Besides, interest revenue related to receivable account will be principally deducted directly from the payment interest but if the amount of the interest revenue is small, it could be deducted from the general administration cost in the operating cost. Allocation of the capital cost of the water supply facility division will be proportional to the book value of the each asset of the division regardless the source of construction fund per every special facility. <JWWA>

(a) Interest Cost

Interest cost comprises of the summation of interest of corporate bond

(b) Asset Maintenance Cost

Asset maintenance cost should be re-invested internally in the water supply services in order to maintain and operate the existing facilities and improve water supply to the valued customers. The amount of the asset maintenance cost included in the revenue requirements and required for expansion/rehabilitation of the facilities and redemption of the corporate bond will be calculated properly by applying the following formula. The fairness of the burden of the valued customers during the period of water tariff calculation will also be examined.

Asset maintenance cost = asset concerned × rate (percentage) of asset maintenance

Here,

(i) Asset concerned will be average balance between the beginning and end of depreciation cost during the period of water tariff calculation.

(ii) Rate of asset maintenance will be calculated as follows; Rate of asset maintenance = average ratio of net worth to total capital × transfer ratio (%)

Where, average ratio of net worth to total capital is 50 % and temporary target of the ratio could be made to mitigate the abrupt change of the water tariff. Transfer ratio (%) will be properly decided from average of the 5 year ratio of the government issued bond for the corporate bond. When water supply services (enterprise) cannot follow the ratio, average profit ratio of the owned capital for the general industry business will be used. <JWWA>

2.3. Reduce costs by further efforts

When we intend to raise water tariff, we have to make the most efforts to reduce costs. Usually

Management Improvement Planning

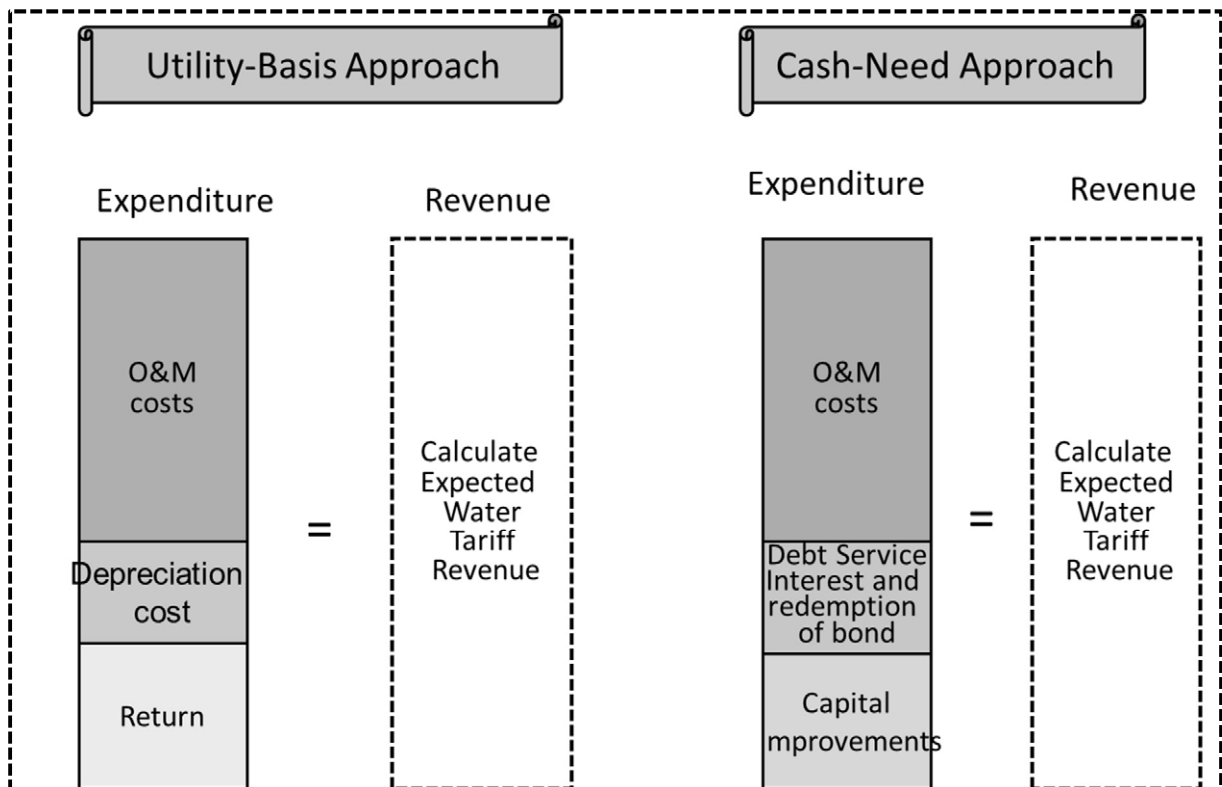
Water supply services (enterprise) should devote their efforts utmost to efficient management in order to make it possible to provide reasonable/inexpensive water tariff to the valued customers. When determination of water tariff is made, management improvement planning should be formulated and targeted cost reduction will be included in operating cost and capital cost of the revenue requirements. <JWWA>

water utility develop management improvement plan together with water tariff raise plan. Following explanation is an example of JWWA which request water utility to make utmost efforts for efficient management.

3. Revenue Requirements

3.1. “Cash-need approach” or “Utility approach”

Receipt of funds in calculating income requirements; Choosing a listing system; The cash need approach calculates the difference between income and expenditure, and the utility approach calculates the depreciation of fixed assets on an annual expense basis.



Cash Need Approach

Only cash transactions are listed. We only deal with cash transactions, so there is no need for cash. To pay interest; Easy to explain to customers and policy makers on loan repayment. Cash Basic system. Single Entry Format Accounting is done in one-sided forms. It is often used in government agencies and is compatible with government organization lists. No depreciation is required. Profit and loss statements and balances are not prepared, so it is not possible to know the actual profit and loss status of the business.

Utility Approach

Utility Approach is an Accrual Basic approach. In Public Corporate Accounting, accounting is used. This system focuses on business ventures, not revenue / expenditure. Accounts are drawn up as a two-way system. This system calculates the depreciation cost of fixed assets. It calculates the profit and loss of a business. Create a balance sheet called a balance sheet to find out the true ownership status of your business. Therefore, this system makes it easy to know the actual asset status of the department and the debt to be repaid. Data has been collected so that future plans can be optimized. However, this system is not suitable for customers. It is difficult for policy makers to easily understand.

ADVANTAGES	
<u>Utility Approach</u>	<u>Cash-Needs Approach</u>
<ul style="list-style-type: none">• Is less subjective.• Better matches cost of service with beneficiary use (e.g., used and useful analysis).• Is more consistent with generally accepted accounting principles.	<ul style="list-style-type: none">• Is consistent with governmental budget practices.• Can be easier to understand because it matches revenue with cash needs.• Is consistent with bond rating agencies' evaluation of revenue-producing capability.• Provides increased flexibility.• Bond covenants are predicated on cash needs.• Is generally accepted by governmental utility industry.
DISADVANTAGES	
<u>Utility Approach</u>	<u>Cash-Needs Approach</u>
<ul style="list-style-type: none">• May generate insufficient or excessive revenue for cash needs.• Is not generally accepted in governmental water and wastewater utility industry unless the utility is regulated.• Provides less flexibility.• Is more difficult to explain to customers/policy-makers.	<ul style="list-style-type: none">• Could result in large net profits or losses if financial statements are prepared in accordance with generally-accepted accounting principles.• Can be more difficult to match the recovering capital costs in varying periods.• Is not usually accepted as a valid method by state public service commissions.

3.2. "Full cost recovery" or "Sustainable cost recovery"

Full cost recovery is a rate that covers all costs (Tariff) equal to the cost of water received.

(Sustainable cost recovery) A rate that covers a fair cost. Tax revenue; All Costs = Tariff + Tax + Transfer In both countries, sustainable cost recovery is widely used in other countries.

Full Cost Recovery All costs are incurred at the same cost (Tariff). Includes capital expenditures (building expansion costs, upgrade costs, and renovations for existing buildings).

Sustainable cost recovery The rate at which fair costs are met Tax revenue; Grant 3 Ts included. Must be able to perform 3 Ts predictions. 3T = Transfer, Tax, Tariff

Sustainable Cost Recovery

A water tariff also needs to be a sustainable cost recovery. Cost includes the following components:

Cost includes the following parts:

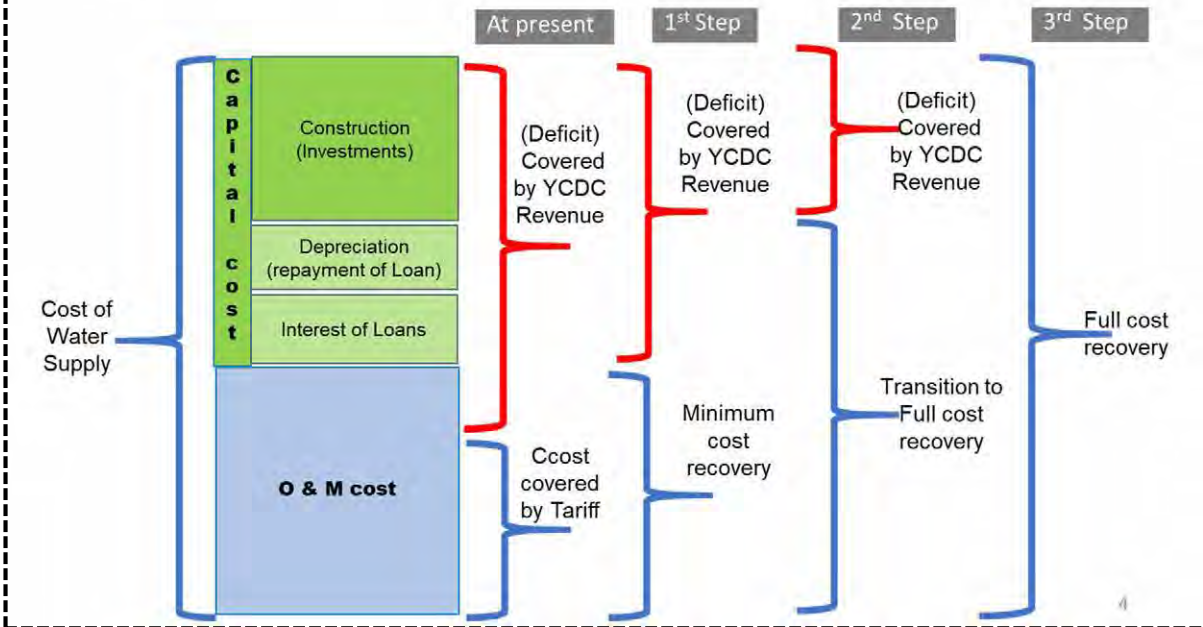
- (1) Cost for Operation and Maintenance
- (2) Administration Cost
- (3) Regulatory Levy
- (4) Debt Service (Payment of Loans)
- (5) Depreciation + Investments Cost

A water plan must be drawn up to cover each step, such as Type-1, Type-2, Type-3, Full Cost Recovery, as shown in the graph, in determining the water tariff for a sustainable cost recovery.

The following graph shows the classification of water rates to ensure sustainable cost recovery:

Cost recovery target

Minimum cost recovery to Full cost recovery



4. Cost Analysis

4.1. Cost Separation

- Variable Cost Operation costs

Operating costs are variable costs. Salary, electricity expenses; Chemical costs; Other general expenses are interest-bearing expenses.

- Maintenance Cost

Maintenance Cost for existing equipment.

- Construction Cost

Construction cost for construction of water supply facilities.

- Customer relating costs

Customer relating costs are high.

- Fixed Costs

Interest payment Debt repayment Depreciation is a fixed expense.

Develop policy to formulate policy

1. For cost-effective policies

- Establish a registration system
- To receive committee funding
- To receive grants

2. For service coverage policy

Meter systems

Price for meter maintenance and usage

Price charged per meter size

3. Collection for home use

Reasonable price for home use

4. Collect at a layered rate to ensure adequate funding

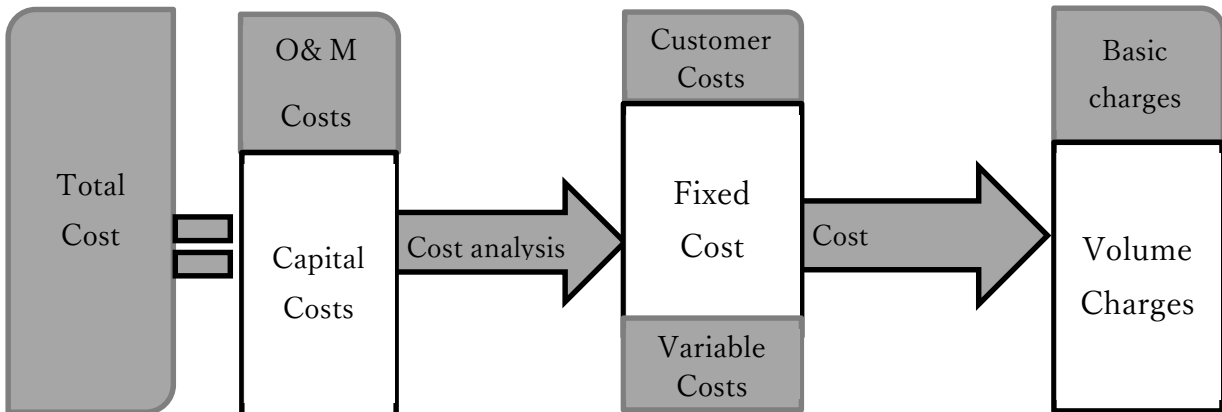
5. To stabilize income

6. To be balanced.

- **Cost recovery**
—the primary objective of any rate structure is to recover the revenue requirements or the costs of providing water service.
- **Revenue stability**
—rate structures should provide revenue that matches changes in the costs of water service..
- **Fairness (defendable)**
—rate structures viewed as fair are preferred from the standpoints of customer acceptance and legal defensibility.
- **Affordability (consideration to domestic use)**
—keeping water service affordable to customers enhances the collection of bills as well as revenue stability.
- **Consistency with cost-of-service principles**
—rate structures consistent with cost- of- service principles are easier to defend and they make it easier to recognize that those who cause costs should pay for them
- **Simplicity (understandable)**
—simple rate structures are most generally preferred to complicated ones; customer understanding is important to achieving customer acceptance.
- **Ease of administration (implementation)**
—feasibility and ease of administration are often important concerns. This objective might also include the capabilities of the billing system.
- **Resource efficiency (conservation)**
—if customers face prices that reflect the costs of providing water service, they can make informed choices about efficient water use, and water waste is minimized.
- **Legal**
—the rate structures should be consistent with applicable laws and regulations.

4.2. Cost Structure and Rate Design

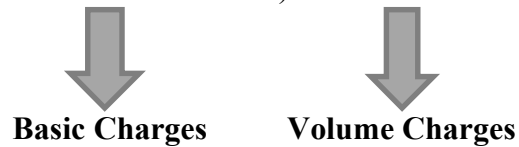
Cost Structure and Rate Design is presented with the following chart:



Total Cost = O & M Cost + Capital Cost

Cost Analysis

Total Cost = (Customer Cost + Fixed Costs) + Variable Cost



JWWA: Allocation of Costs to Basic charges and Volume charges

Revenue requirements can be classified into customer cost, fixed cost and variable cost and then will be allocated to basic charge and usage charge in accordance with the following procedures.

(a) Customer Cost

All customer cost should be allocated to basic charge in accordance with the following procedures.

- (i) Customer cost which is related to the meter reading/tariff collection cost should be equally allocated to each valued customer.
- (ii) Customer cost related to water meter will be allocated by differential discriminated procedures in proportional to the purchased cost.

JWWA: Allocation of Costs to Basic charges and Volume charges (continued)

(b) Fixed Cost

A part of the fixed cost will be divided into basic charge and usage charge and then the cost allocated to the basic charge will be charged by differential discriminated procedures for the characteristic of demand of each valued customer and will be allocated equally by 1 m³ per usage. When the allocation of the fixed cost and allocation of the fixed cost to which allocated the basic charge will be properly selected from the following procedures by considering actual conditions of each water supply services (enterprise).

i) Procedure of Allocation of Fixed Cost

(i) Fixed cost is allocated in proportional to maximum distribution volume against the difference between maximum distribution volume to average distribution volume, and the remainder will be allocated to usage charge.

(ii) Cost of distribution/service division of the revenue requirements will be allocated to the basic charge and the remainder will be allocated to the usage charge.

ii) Procedures of Allocation of Basic Charge

(i) Basic charge will be allocated by analyzing the theoretical flow rate and the actual water consumption of the service area.

(ii) Basic charge will be allocated by considering ratio of the theoretical flow rate and ratio of the cross section of the water meter installed.

(iii) Basic charge will be allocated to proportionate the theoretical flow rate and the combined maximum daily water demand and/or maximum hourly water demand of each customer group.

(c) Variable Cost

All variable cost will be allocated equally to the usage charge.

5. Rate Design

When calculating the cost of water supply in calculating the cost of water supply, the less water is used, the less water will be produced. If you use more water, you will have to increase production costs.

5.1. Key factor (Principle) for rate design

Key points to ensure a reasonable rate of increase in water tariffs:

1. The rate that covers the basic cost to meet the income requirement should be the rate that supports the water supply business.
2. Fiscal stability for changing costs; To be strong.
3. Adequate funding.
4. Adapt to cost savings.
5. To make the public understand the issue of water tariff collection.
6. Make the collection rate easy.
7. Make it affordable for ordinary people.

The official collection rate is legal. Must comply with the rules and regulations.

Rising water prices are not good for water users, but good water quality and efficiency are needed to improve the water supply system. Water pressure Provide 24-hour water supply. Prior to the current water price increase, water pressure and water quality are being improved. The Kokkova Project is underway and is being prepared. To make the price that customers can pay. To improve the system, it must be calculated fairly. Things that need to be done need to be balanced.

Here is a basic explanation of rate design from JWVA's manual.

In many cases in water utility sector, if water rate design is set according to basic principle, fixed costs reflect to much higher basic/fixed charges and that is not good in economical, social and environmental aspects. There need some more appropriate cost allocation methods which included in the following article.

Criteria for Calculation of Individual Cost Basis

a. Basic Concept

Most extreme calculation method of revenue requirements is to allocate all the customer cost and the fixed cost to basic charge and all the variable cost is to allocate to usage charge. However, this method would result the basic charge extremely expensive to the valued customers and water tariff system itself will have very difficult problem as well as it will be against (conflict with/contradict) the basic principle of the water tariff determination as required to assure supplying potable water with reasonable/inexpensive prices to the valued customers.

Storage of raw water for a certain time will be possible, and then it will not be reasonable to allocate all the fixed cost to the basic charge because not all of the fixed cost deems to be proportional to the characteristic of demand of each valued customer. Accordingly, a part of the fixed cost which will be relatively proportional to the characteristic of demand of each valued customer and all the customer cost will be more appropriate to allocate to the basic charge. <JWVA>

5.2. Some examples of Rate Design

5.2.1. Flat rate or metered rate

The YCDC uses both fixed rates and meter rates to collect water bills. Work is underway to transition to a fixed meter billing system. The fixed rate should be abolished in the coming years for some reason mentioned in the manuals.

AWWA(*2) Unmetered customer or Flat rate customer

For utilities that have customers with unmetered water service, it is difficult to develop water rates that fully recognize the principles of fairness and equity to such customers. This is because the unmetered customers' annual or monthly usage cannot be measured. Additionally, unmetered customers tend to use more water than metered customers because they typically pay a flat charge regardless of water use. Therefore, they do not perceive a price signal to reduce unnecessary water use.

It is necessary to establish a separate class and rate for customers that have unmetered service. The utility may want to incorporate incentives in the water rates applicable to unmetered customers that would encourage such customers to change to a metered service, e.g., the water use levels assumed in developing the flat rate for unmetered customers are greater than the average use indicated for metered accounts or the utility may provide the meter and/or installation at no cost to the customers. Alternatively, the utility may establish a policy that requires all customers to be metered.

5.2.2 Two-part water tariff or utility unit water bill

The Tokyo Water Supply System charges a two-part water rate. YCDC can consider other options. Here are some suggestions on how to look or get an appointment for antique items:

LWUA's Manual: Two Part Tariff

A basic rate structure should be made up of two parts.

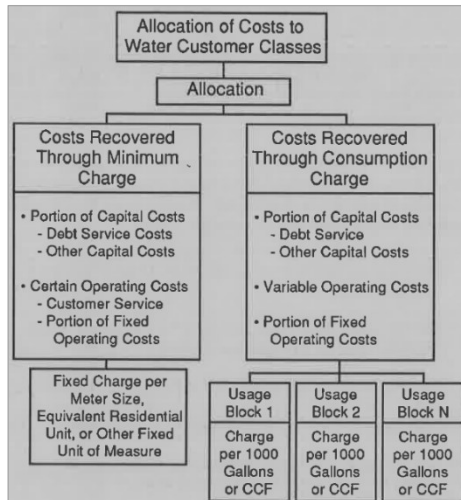
The first part, the base rate, is a charge per customer to recover fixed expenses, including the cost of debt service, reserve requirements, and capital improvements. This charge guarantees enough income to meet the utility's basic costs during periods of low water sales due to drought or other reasons.

The second part, called the unit rate, is a charge per unit of water sold to cover the cost of operation, maintenance, and administration.

With this two-part structure, all customers share equally in the basic costs of the water system and each pays only for the water used. It is important to note that a rate schedule that shares the fixed cost equally among all customers, regardless of how much water each uses, is fair only when the demand by all customers is relatively uniform (1/2 inch or 3/4 inch meters, for example). Customers with greater demand who require larger meters need to have an increased "base rate". The increase is calculated using an equivalent meter and service ratio.

Arthur Young Guide: Two Part Tariff: Minimum Charge and Consumption Charge

Minimum Charges (or Basic Charges)



The rationale for having a minimum charge is to recover certain costs as a fixed component of the customer's bill. The more costs recovered through the minimum charge, the more guaranteed revenue the utility can expect. On the other hand, the less control that the customer has in affecting his ultimate charge (as with a high minimum charge), the less likely he will be to conserve usage. Bond rating agencies look favorably upon user charge structures that recover a high percentage of revenue requirements through fixed charges, since bond holders are more protected when revenue is less dependent upon usage.

Some rate technicians assume that minimum charge provides for some allowance of water or wastewater usage. The term "minimum charge" in the context of this book does not require the charge to include such an allowance. The minimum charge as discussed in this chapter is defined as fixed "service charge" that might or might not include a usage allowance. Several types of costs could logically be recovered through the minimum charge.

First of all, capital costs associated with facilities that are available for providing basic service to the customer could appropriately be recovered through the minimum charge. When debt is used to finance major facilities, the utility has to pay debt service whether usage materialized or not. By recovering debt service costs through the minimum charge, the utility would be passing this fixed cost proportionately to each customer.

Another type of cost that could logically be recovered through the minimum charge would be customer service costs.

Finally, an argument can also be made for including other fixed operating costs in the minimum charge. Certain fixed operating costs have to be paid by the utility whether or not usage materialize, and the utility could logically recover these costs through the minimum charge.

In an extreme example, all utility costs might be recovered through the minimum charge. Such structures are called "flat rate" systems. In determining the types of cost to be recovered through the minimum charge, the utility would need to evaluate the impact on customers and other pricing objective.

After the costs to be recovered through the minimum charge are identified, the next step is to identify the appropriate unit of measure for recovering these costs. For example on a "per account" basis or on meter-size equivalents. The meter size represents a potential level of demand placed on the water system by the customer, with the larger meter size recovering a greater percentage of demand-related cost.

Consumption Charge

Variable operating costs or some portion of fixed costs which not recovered through minimum charges must be recovered through consumption of water. Charges based on consumption vary by the amount of usage, typically measured through water meter readings.

5.2.3 Minimum water rate

YCDC's new water tariff, the minimum water tariff, should be considered with reference to the following quotes from AWWA:

AWWA(*1) Fixed Charges or Basic Charges and minimum charges

Water utilities use many different types of fixed charges (or Basic Charges) in their rate designs. Three commonly used fixed charges are **billing (or customer) charges**, **service (or meter) charges**, and **minimum charges**.

Billing or Customer Charges

The terms *billing charge* and *customer charge* are often used interchangeably. This charge typically recovers costs such as meter reading, billing costs, and other costs that the utility incurs equally per customer or per account.

This type of fixed charge can be the same for all customers or it can vary by customer class if certain customer classes have more complicated billing or customer service requirements.

These costs are not a function of the amount of consumption a customer uses. An example of a billing or customer charge is \$6.00 per bill. A billing charge is relatively easy to calculate, implement, and understand. A billing charge is frequently lower than other types of fixed charges (or represents a relatively small component of a larger overall fixed charge).

Service or Meter Charges

A *service charge* (or *meter charge*) is a fixed fee that increases with meter size. It often recovers the same costs as a billing charge plus other customer-related costs that change as a function of meter size. These other costs typically include meter-related costs such as meter testing, repairs, and replacements.

Table IV.7-1, based on inside-city unit costs of service from Table III.2-5, shows an example determination of a schedule of monthly service charges. Because service charges vary by meter size, they may be more complicated to explain and require additional data to allocate costs to each meter size in a fair and equitable manner.

In some cases, utilities include other costs to provide service to a customer as a part of a service or meter charge. The argument is made that utilities make investments to provide the ability to serve, and that these costs must be recovered regardless of the amount of water used during a given period. This is sometimes referred to as a readiness-to-serve charge. An approach that may be useful in establishing a cost basis for readiness-to-serve costs is referred to as the minimum system analysis.

This analysis considers that there is a minimum system in place to meet minimum service requirements regardless of use. The minimum needs are defined by determining the minimum size a system would be designed to meet minimum or average service needs (e.g., 4-in. service) not considering sizing for peak-day capacity needs or fire protection. The percentage of the distribution system related to meeting the minimum system needs would be applied to distribution related costs and would be collected in the fixed charges.

Incremental system sizing related to sizing the system to meet peak-day needs and fire flow requirements may also be considered for inclusion in the fixed charges. Fire protection charges are discussed in more detail in chapter IV.8.

The requirement to recover costs without regard to the volume of sales is real, but it does not necessarily suggest that fixed charges should represent a large portion of total revenue requirements, nor that the rate structure should match the cost structure of a utility. The use of a water system is reflected in both potential and average usage patterns, so a continued reliance on volumetric charges to recover fixed costs has value from an equity perspective. The extent to which a strategy of large service charges is employed is frequently limited as a result of concerns over impacts on affordability for smaller-volume customers.

AWWA(*1) Fixed Charges or Basic Charges and minimum charges (continued)

Minimum Charges and Water Allowance

A minimum charge is equal to the sum of the fixed-fee components of a water bill that must be paid regardless of metered usage. A minimum charge could consist of a billing charge, or a billing charge plus a meter charge. In some cases, a fixed fee based on an allowance for a certain amount of water consumption is included in the minimum charge.

The allowance is the minimum volume of consumption for which a customer is billed regardless of whether or not the water is used. The allowance is generally set at a relatively low level to equal an amount that is typically used by most customers in a month. Some utilities use an increasingly larger water allowance for larger size meters.

The minimum charge may be viewed as a means to recover a portion of fixed costs associated with investments to which all customers should contribute, because the utility continues to incur the fixed costs regardless of whether customers consumed water during that billing period.

This charge typically recovers the same costs as the billing and service charges, plus the cost of the allotted consumption allowance, multiplied by the consumption rate. For example, if a utility had a service charge of \$12.26 per equivalent ½-in. meter and a consumption charge of \$2.81 per thousand gallons (based on the residential cost per thousand gallons as displayed in Table IV.2-2) and it wanted to set a minimum charge that included 2,000 gallons, the minimum charge would be \$17.88 per equivalent meter ($\$12.26 + [2 \times \$2.81]$). Table IV.7-2 shows how to calculate a minimum charge by meter size. This example assumes the service charges presented in Table IV.7-2 and a consumption charge of \$2.81 per thousand gallons for all meter sizes.

Minimum charges generally result in the highest fixed fees of those fees discussed herein. Often they are criticized for being unfair in that they charge a customer for consumption even when the customer does not use the allotted amount of water.*

It is often assumed that a minimum charge adds to the utility's revenue stability. However, if the consumption allotment for a minimum charge is set at a low level, a utility may actually receive little benefit in terms of revenue stability. The amount of revenue generated from the consumption component of the minimum charge is revenue that, for the most part, would normally be generated from water sales using the consumption charge.

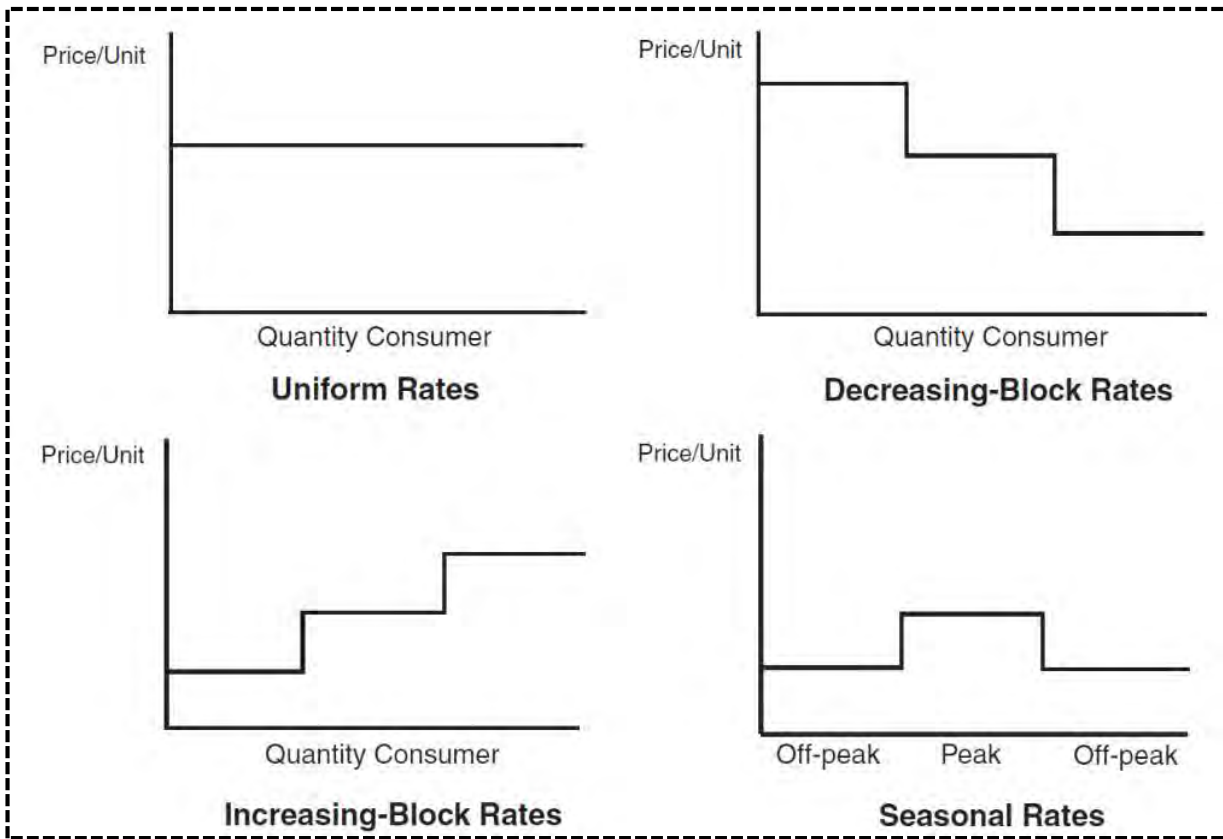
5.2.4 Increasing block rates or Uniform rate

In order to conserve water, the water utility should be familiar with increasing block rates or uniform rates when adjusting water tariffs. Examples of other rate designs and assessments can also be considered in the following articles.

Alternative rate design

When we set unit price we shall think of some patterns of unit pricing. Here are 4 patterns from AWWA Manual which describes “uniform rate”, “decreasing-block rate”, “increasing-block rate” and “seasonal rates”. Increasing-block rates is the most popular system globally and here is a table of comparison of evaluation of 4 patterns which pluses “flat rate” and excludes “decreasing-block rate” from the former figure. “Seasonal rates” is theoretically attractive but it needs more sophisticated data of customer usage in order to introduce.

AWWA *2: Alternative rate design



AWWA *2: Example of evaluation

Objectives	Increasing Block Rate	Uniform Block Rate	Seasonal Block Rate	Flat Rate
Fairness	High	Satisfactory	Satisfactory	Low
Conservation	High	Satisfactory	Satisfactory	Low
Equity	High	Satisfactory	Satisfactory	Low
Cost-of-Service Based	High	Satisfactory	Satisfactory	Low
Understandable	High	Satisfactory	Satisfactory	High
Feasible	High	Satisfactory	Satisfactory	Low
Defendable	High	Satisfactory	Satisfactory	Low
Revenue Stability	High	Satisfactory	Satisfactory	High
Cost Recovery	High	Satisfactory	Satisfactory	Satisfactory
Legal	High	Satisfactory	Satisfactory	Low

Key: Relative Support of Objective

High Satisfactory Low

5.2.5. Customer categories by diameter of pipe or domestic / commercial

There is no pipeline for the distribution of water for public and commercial use by the Water Supply and Water Supply Authority. Public use is charged at 88 kyats per unit and commercial use is charged at 110 kyats.

There is no pipeline distinction for foreigners living in foreign households. At 440 kyats per unit, foreign businessmen are charged as foreign traders.

Large hotels with high water consumption; For commercial use, there are separate sites, but the water fee is charged at 880 Kyats per unit.

Water supply to low-consumption foreign businesses is charged at Ks 880 / - per unit, regardless of pipeline.

Exercise

Exercise I Tariff setting exercise on Mid-term Management Plan

The Fiscal Year Plan has been drawn up from 2018-2019 to 2020-2021. With this project, calculations were made to increase water tariffs.

1. Financial Plan Development for Mid-term Plan

The financial plan for setting a fair water tariff is (1) the total number of water connections, (2) the availability of water, (3) the sale and collection of water, and (4) the revenue and expenditure accounts.

1.1. Three-Years Operating Income Forecast

Over the next three years, EDWS is envisaged to grow its income from 11,500 million Kyat in 2017/18 to 26,375 million Kyat in 2020/21. The annual increase ratio is expected to be 32% from 2017/18 to 2020/21. One of the key milestones is the starting operation of Lagunpyin WTP for Thilawa SEZ and domestic during the mid-term. Hence, the above operating income will be underscored by achievement of incremental operating profit by water supply of Lagunpyin WTP.

Operating income for the next three years is summarized as follows.

Items	Projection by fiscal year (mil.kyat)			Total
	2018-2019	2019-2020	2020-2021	
A. Operating Income Total	12000	23991	35973	71964
1 Water service charge	11419	20959	32941	65319
1-1 Department	1600	1600	1600	4800
1-2 Public Water Charge	9819	9035	9035	27889
1-3 Incremental revenue by improvement -Domestic	0	642	940	1582
1-4 Incremental revenue by improvement -Commercial	0	535	784	1319
1-5 Incremental revenue by Lagunpyin	0	9147	20582	29729
2 Water connection fee	450	450	450	1350
Incremental revenue by Lagunpyin	0	2450	2450	4900
3 Rental of shops and sites	70	70	70	210
4 Plumber license fee	1.3	1.3	1.3	3.9
5 Toll fee	0.1	0.1	0.1	0.3
6 Other incomes	60	60	60	180
	12000.4	23990.4	35972.4	71963.2

Table 1 Operating Income Forecast for FY2018/19-FY2020/21

1.2. Three-Years Operating Cost Forecast

Operating costs is assumed to increase 19,259 million kyat in 2017/2018 to 27,016 million kyat in 2020/21. The annual increase ratio is 13% from 2017/18 to 2020/21. During the period of this mid-term, operating costs for Lagunpyin WTP will be incrementally occurred.

Operating costs for the next three years is summarized as follows.

Table 2 Operating Costs Forecast for FY2018/19-FY2020/21

အကြောင်းအရာ	ဘဏ္ဍာရေးနှစ်အရက်တင်စန့်မှန်းချက် (mil kyat)			စုစုပေါင်း
	၂၀၁၈-၂၀၁၉	၂၀၁၉-၂၀၂၀	၂၀၂၀-၂၀၂၁	
A. Operating Expenditure Total				
သာယာအသုံးစရိတ်စုစုပေါင်း	22319	24566	28013	74898
2-1 Salarly လစာ	2658	3008	3273	8939
2-2 Labour Charges လုပ်သားခ လုပ်အားခ	2084	1877	2042	6003
Incremental personnel costs by Lagunpyin				
လခွန်းပြင်စီမံကိန်းမှတိုးပွားလာသောဝန်ထမ်းဆိုင်ရာကုန်ကျစရိတ်	0	71	124	195
2-3 Electricity	9800	13322	14494	37616
Incremental Electricity costs by Lagunpyin	0	189	1308	1497
2-4 Petro & Lubricant မိတ်ဆီ နှင့်ဆော့ဆီ	100	90	97	287
2-5 Procurement ဝယ်ယူခြင်း	3339	1925	2094	7358
Incremental Chemical costs by Lagunpyin				
လခွန်းပြင်စီမံကိန်းမှတိုးပွားလာသောမိတ်ဆီဆေးရည်သုံးစွဲမှုကုန်ကျစရိတ်	0	23	162	185
2-6 Printing & Publishing				
ပုံနှိပ်ခြင်းနှင့်ထုတ်ဝေခြင်း	50	73	80	203
2-7 Materials, repair, maintaince and spare parts				
ပစ္စည်းပြင်ဆင်, ထိန်းသိမ်းခြင်းနှင့်အပိုပစ္စည်းများ	4178	3909	4253	12340
2-8 Other expenditure	111	79	86	276
	22320	24566	28013	74899

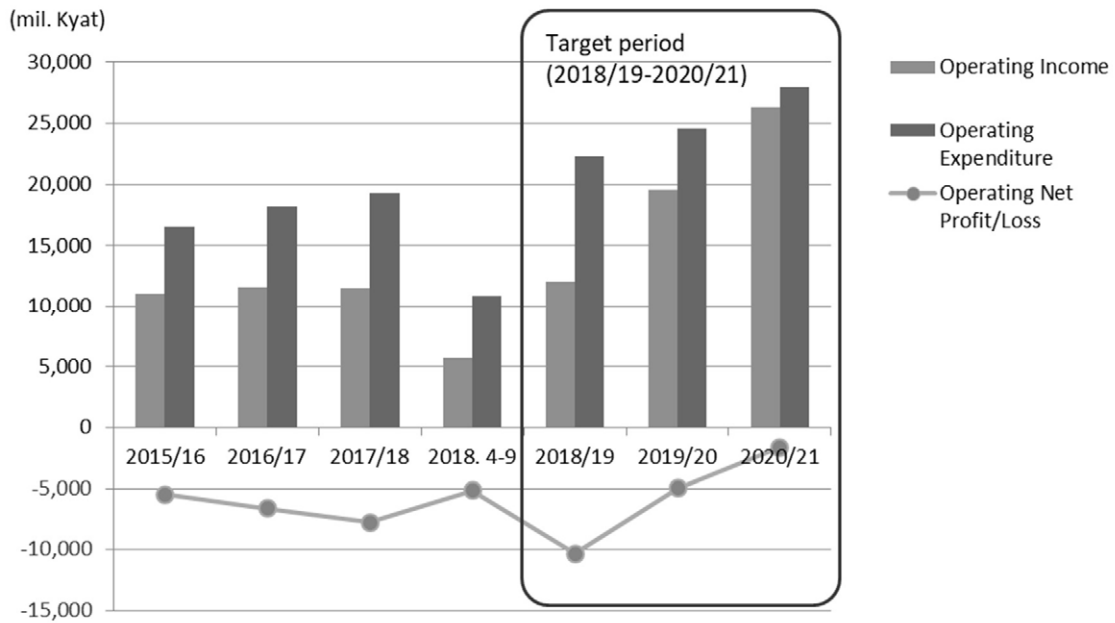
1.3. Net Operating Balance

The net operating deficit is estimated to be 10,319 million Kyat in FY2018/19, however it is expected to be an upward trend and the deficit will be largely recovered with 1,638 million Kyat deficit in FY2020/21. Hence, a significant target of financial management during the next three years could be mostly close to operating cost recovery. The net operating balance in FY2020/21 will be significantly dependent on the successful operation of Lagunpyin WTP and the appropriate billing and collection on schedule.

Table 3 Operating Balance Forecast for FY2018/19-FY2020/21

Items	Projection by fiscal year (mil. Kyat)		
	2018/19	2019/20	2020/21
A. Net Operating Balance	-10,319	-4,968	-1,638
Operating Income	12,000	19,598	26,375
Operation Expenditure	22,319	24,566	28,013

[Note] Operating costs does not include depreciation costs



1.4. Three-Years Capital Expenditure and Investment Forecast

The capital investment needs over the next three years will amount to 730,833 million Kyat, equivalent to the annual average of 243,611 million Kyat. This investment is necessary to construct water facilities to meet the future water demand of Yangon City. The major portion of investments for the mid-term covers the costs of on-going ODA projects such as Lagunpyin and Kokkowa projects.

Approximately 70% of the capital investment will be sought from donor funding of the Japanese government, and the remaining portion will be covered by the Union government budget.

Capital expenditure required for the next three years is summarized as follows.

Table 4 Capital Expenditure Forecast for FY2018/19-FY2020/21

Three Year Financial Projection (Mid-Term Plan)

Items	Projection by fiscal year (mil.kyat)			Total
	2018-2019	2019-2020	2020-2021	
B. Capital Expenditure	153001	286650	291171	730822
1 ODA Loans	126419	256992	257628	641039
1-1 Lagyunpyin WS Project (Total)	96644	76392	46490	219526
1-1-1 Lagyunpyin WS Project (YCDC)	19051	13692	10740	43483
1-1-2 Lagyunpyin WS Project (ODA)	77593	62700	35750	176043
1-2 Kokkowa River WS (Total)	29775	180600	211138	421513
1-2-1 Kokkowa River WS (YCDC)	9775	29931	45988	85694
1-2-2 Kokkowa River WS (ODA)	20000	150669	165150	335819
2 YCDC Activities	26582	29658	33543	89783
2-1 Intake & Treatment	1836	5782	3905	11523
2-2 Transmission and Distribution	8125	13071	16747	37943
2-3 Service Pipe and Meter	9795	5991	7901	23687
2-4 Other Infrastructure	6827	4815	4990	16632

25

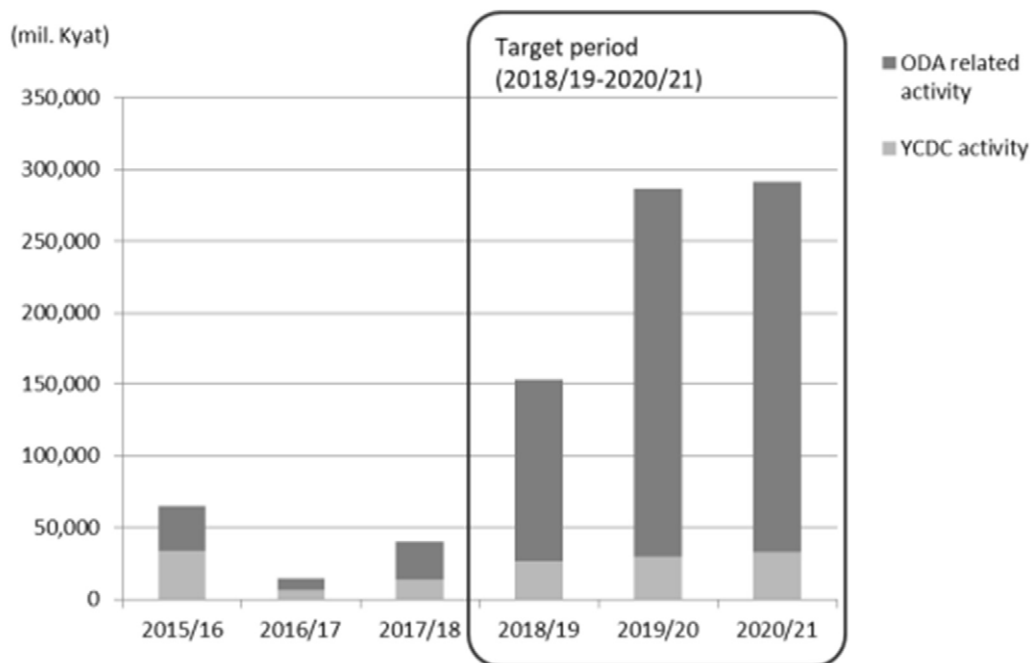


Figure 1 Capital Expenditure (Past and Projection for 2018/19-2020/21)

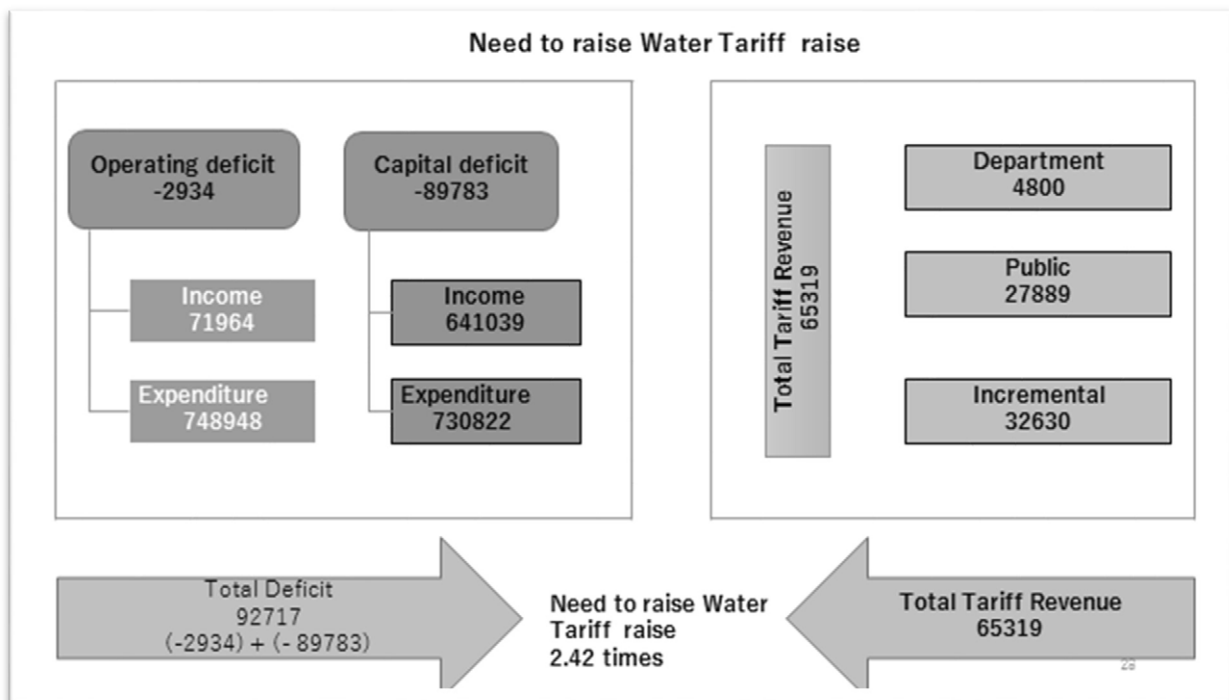
2. Exercise of tariff setting according to Mid-term Plan

2.1. Deficit Calculation

Particular	2018-2019	2019-2020	2020-2021	Total
Income				
Water Tariff Income	11419	20959	32941	65319
Other Income				6645
Total Operating Income	12000	23991	35973	71964
Operating Deficit				
Total Operating Income	12000	23991	35973	71964
Total Operating Expenditure	22319	24566	28013	74898
Total Operating Deficit	-10319	-575	7960	-2934
Capital Deficit				
ODA Loans	126419	256992	257628	641039
YCDC Capital Expenditure	26582	29658	33543	89783
Total Capital Expenditure	153001	286650	291171	730822

Total Deficit=Operating Deficit (2934) +Capital Deficit (YCDC's subsidy) 89783 = 92717

2.2. Calculation of Tariff raise ratio



2.3. Calculation of Full cost recovery v.s. Sustainable cost recovery

To obtain sustainable water management, deficit shall be covered by tariff and any other financial resources. In the developed countries, usually all costs are covered by water tariff, however, in developing countries it is often too ambitious target for short term. Step by step, it shall be realized and meanwhile subsidies from general account may be alternative financial resources to cover deficit which showed in the figure of page 60 “Cost recovery target – Minimum cost recovery to Full cost recovery.

	Revenue Requirements 158036 = 65319+92717	
	Operating Cost :8253 (2934+5319)	Capital Cost: 89783
	Full Cost Recovery (Type 1)	
	Water Tariff Raise 142% (2.42 Times) Water Tariff revenue : 158036	
	1. (Type 1) Full cost recovery calculation = 158036 / 65319 = 2.42 times 2.42 x 88= 213 kyat 213-88= 125 /88=142%	
Financial support From YCDC's General Account	Full Cost Recovery (Type 2)	
	Half of Capital cost 44892 (89783/2)	Water Tariff raise 1.73 Time (79%) Water tariff revenue 113144 (158036-44892)
	2. (Type 2)Half cost recovery calculation = 113144 / 65319 = 1.73 times 1.73 x 88= 152 kyat 152-88= 64 / 88 = 73 %	
	Sustainable Cost Recovery (Type 3)	
	All Capital Cost 89783	Water Tariff raise 1.045Time(4.5%) Water tariff revenue 68253 (158036-89783)
	Deficit 92717	Tariff Revenue 65319
	3. (Type 3)All operating cost recovery calculation = 68253/65319=1.045 times 1.045 x 88= 92 kyat 92-88= 4 /88= 4.5%	

1. Full cost recovery calculation (Type 1)	= 158036/65319=2.42 times
	2.42 x 88= 213 kyat 213-88= 125 /88=142%
2. Half cost recovery calculation (Type 2)	= 113144/65319=1.73 times
	1.73 x 88= 152 kyat 152-88= 64 / 88 = 73 %
3. All operating cost recovery calculation (Type 3)	= 68253/65319=1.045 times
	1.045 x 88= 92 kvat 92-88= 4 /88= 4.5%

Exercise II An idea of Tariff Design for the coming stage

We must first discuss the current social and environmental conditions in order to set a new water tariff. At the same time, financial statements and revenue requirements for the future must be calculated based on past data. By introducing the ideas, the water tariff design will be designed and implemented for the new water tariff.

Yangon's existing water tariff and newly revised tariff

- At the current, the water tariff is being collected in Linear Tariff System (Flat rate).
- In addition to increasing revenue, in order to reduce NRW and uncontrolled water use, basic rate system and increasing block tariff system (IBT system) will be introduced.


Category	Consumption (unit – m3)	Tariff rate (MMK per m3)	Tariff rate (MMK per m3)
-Domestic	1 -5	1000 (Basic Rate)	2000 (Basic Rate)
-Departmental	6 – 15	88	220
domestic	16 - 30	110	275
-YCDC staff housing	31 and above	110	330
-Commercial	1 – 5	2000 (Basic Rate)	4000 (Basic Rate)
-Departmental	16 – 30	110	330
Commercial	31 and above	110	440
-FE (Domestic)	-	440	440
-FE (Commercial)	-	880	880

(This is just an example of alternative tariff designs)

References:

1. Guidelines for Water Tariff Setting (JWWA Manual, 2015), Japan Water Works Association (JWWA)
2. Principles of Water Rates, Fees, and Charges (Fifth edition, 2000), Manual of Water Supply Practices M1, American Water Works Association (AWWA)
3. Developing Rates for Small Systems (First edition, 2004), Manual of Water Supply Practices M54, American Water Works Association (AWWA)
4. Guidelines for User Fees and Cost Recovery (October 2010), African Development Bank
5. Manual on Water Rates and Related Practices (2nd Edition, February 2000) , Local Water Utility Administration (LWUA) Philippine
6. Water and Wastewater Finance and Pricing (Arthur Young Guide), George A. Raftelis, Lewis Publishers, 1989

Annex-2.C: Maintenance of Fixed Assets Lists

	Yangon City Development Committee Water Resource and Water Supply Authority Engineering Department (Water & Sanitation)		SOP Code No: EDWS-FD-OPZ
	..... Division Section		Version No: 01 Effective Date: Page 1 of 2 Developer: AE Verifier: DYOE Approval: CE

1. Maintenance of Fixed Assets lists

2. Objectives & Scope


- 1) It is intended that the fixed assets will be properly registered.
- 2) To call for the collaboration of all sub-sections, sections and division of EDWS.

3. Abbreviations and definitions

- Fixed Assets Definition*
- Fixed Asset means the materials that can be used more than one year, and are durable and not for sale.*
- *Fixed Assets – tables, chairs, cupboard, office furniture, computer, air conditioners, typing machines, calculators and office equipment, motors, vehicles, machinery & equipment, buildings, reservoirs, intake towers, water treatment plants, pumping stations, various pipe lines, other items purchased by YCDC budget, donated by organizations*

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Fixed Asset list request	Relevant officer and staff	Accounting Officer
2	Registration	Relevant officer and staff	Accounting Officer
3	Completing the required information of fixed assets	Relevant officer and staff	Accounting Officer
4	Calculating Depreciation	Relevant officer and staff	Accounting Officer
5	Inspection of fixed assets	Relevant officer and staff	Accounting Officer
6	Maintenance of fixed assets	Relevant officer and staff	Relevant in-charged
7	Cancellation of fixed assets	Relevant officer and staff	Relevant in-charged
8	Causes of fixed assets cancellation	Relevant officer and staff	Relevant in-charged
9	Retirement of fixed asset	Relevant officer and staff	Relevant in-charged

	Engineering Department (Water & Sanitation) Division Section		SOP Code No: EDWS-OP1-A1
	..... Division Section		Version No: 00 Effective Date: April 9, 2021 Pages: 2 of 5

5. Procedure

5.1 *Fixed Asset List Request* The list of all fixed assets, including total expense and detailed information, in District offices, township offices, Water Treatment Plant, Pumping Station and Reservoir Offices, and other branch offices is submitted including at the end of each year to Finance Division at the end of each year, and cooperate with Finance Division.

5.2 *Fixed Asset Registration*

- Property, Plant and Equipment will be registered as fixed assets when the following conditions are met:*
- a) *The value of asset will be accurately registered. (MAS 3)*
 - b) *All fixed assets purchased with YCDC budget or other mean, and handed over by donors will be registered.*
 - c) *The details of machineries, equipment and buildings will be registered in general ledger.*
 - d) *The purchasing value, depreciation cost/value and residual value will be filled.*
 - e) *(1) Machine model, (2) descriptions and (3) details of the machine will be registered in fixed asset registration book.*
 - f) *The asset will be registered in Accounting section and respective branch/township office at the same time.*
 - g) *The capital budgeting costs of fixed assets, permission, receipts, contracts and maintenance record will be kept systematically.*
 - h) *The damages of fixed assets will be recorded.*
 - i) *In case of asset selling or transfer, the permission documents and selling price will be recorded. (To balance the costs of the sale.)*
 - j) *To properly record the fixed assets with insurance.*
 - k) *All the above mentioned activities will be done by all branch offices in cooperation with Head office.*

5.3 *Completing the required information of fixed asset*

When the longstanding fixed asset is lack of the acquisition cost and acquisition year, the followings will be followed:

- a) *Basic Value of Fixed Asset*
 - (i) *Apply the closest value when no data is available*
 - (ii) *To reference the value of the same condition assets from other water supply group*
 - (iii) *To reference the value of other same asset*
 - (iv) *If the asset purchased three years ago cannot be known and is same with recently purchased asset, the value of new asset can be referenced by deducting some percentage for the estimation of the value of asset purchased three years ago.*
 - (v) *To estimate the approximate value of the asset based on its structure and material*
- b) *When the acquisition year of fixed asset cannot be known,*
 - (i) *To estimate the acquisition year based on the similar asset*
 - (ii) *To estimate the acquisition year based on historical documents*
 - (iii) *To estimate the acquisition year of the asset based on the asset condition and its remaining useful life*

(iv) To estimate the acquisition year based on the same product with similar conditions and functions

(v) To estimate the acquisition year based on the type and structure of asset

(vi) To estimate the acquisition year by referencing the manufacture catalogue

(vii) To set the acquisition year the same as the construction year of the building if the useful life of asset inside the building is not known

(viii) Can set the acquisition year of asset the same as project beginning year

(ix) To estimate the acquisition year by comparing inflation rate when the asset value is available

5.4 Calculating Depreciation

5.4.1 Acquisition Cost (MAS 11)

(a) Land, building, machines, tools and equipment with all information including the acquisition cost will be registered in the asset ledger.

Explanation: Initial cost includes all capital costs; eg. Land reform fee, transportation fee and construction fee.

(b) The acquisition cost of fixed asset will include new construction cost, expansion cost and maintenance cost. The purchased year and date, initial cost, additional useful life after maintenance, annual depreciation rate and cost, and current year's value will be kept record.

(c) When the asset purchased under capital cost is received, depreciation will be calculated since received year.

2C - 2

5.4.2 Depreciation

Depreciation of fixed assets will be calculated according to specified useful life. (If the minimum and maximum useful life is applied, the reason shall be mentioned.)

Useful Life (Explanation) MAS 3

(a) The period when the organization is expected to use an asset

(b) The estimated number of products to be produced from the property

Note: The useful life should be reviewed regularly and revised if necessary.

5.4.3 Depreciation Method

Straight-Line Method to be applied (Get approval to apply the method).

To adapt the depreciation method in line with the situation except for the rationale for adapting other methods. The depreciation method shall be practiced in a constant manner. In case of the change of depreciation method, the reasons of change and results of the changing period will be described.

5.4.4 Book value after Depreciation

The book value after depreciation is the remaining cost of an asset after the related amount of accumulated depreciation has been deducted from it.

Permission is needed to set residual value/salvage value.

5.5 Inspection of Fixed Asset

The inspection of the fixed assets within the department shall be conducted at least once a year by the respective in-charged to countercheck all fixed assets on ground with fixed asset ledger. If any difference is found, the inspector will report it to head of

department/officers without any hesitation. If the damage or loss of asset is found any time, the in-charged person will report it to officers of the department with no delay.

5.6 Maintenance of fixed assets

The respective in-charged person will be responsible to maintain the fixed assets in order to facilitate the operation of fixed assets. Regular monitoring and maintenance of fixed assets will be conducted periodically.

5.7 Cancellation of Fixed Asset

The Fixed Asset must be deleted from the fixed asset ledger if the asset is no longer used due to the termination of useful life. If the asset is still usable after useful life expiration, the expansion of useful life will be set.

5.8 Causes of Fixed Assets Cancellation

i) If the fixed asset is no longer useful (useful life expiry), the report of fixed asset suspension must be submitted to the relevant division.

ii) In case of selling, transferring, relocating and losing of fixed asset, the report shall be submitted to headquarter.

5.9 Retirement of Fixed Assets

i) The assets that are not used or unwanted, that can't be sold, and that the selling cost is higher than selling price

ii) Asset that needs complete restoration

iii) Missing data to build a building. There is no longer chance to build on that. The demolition of that building

iv) After the retirement or disposal of fixed assets such as property, plant and equipment, the difference between net income from disposal and net worth of the asset must be calculated and the net profit or loss generated by the disposal of asset will be recorded as income or expenditure in the profit and loss account.

6. Related Documents

No

7. Related Forms

EDWS-FD-OP1-W3-F1

Fixed Asset Ledger/Lists

EDWS-FD-OP1-W3-F2

Fixed Asset Registration Form

EDWS-FD-OP1-W3-F3

Depreciation Rate Table

EDWS-FD-OP1-W3-F4

Depreciation Rate Table

EDWS-FD-OP1-W3-F5

Depreciation Rate Table

EDWS-FD-OP1-W3-F6

Depreciation Rate Table

EDWS-FD-OP1-W3-F7

Depreciation Rate Table

EDWS-FD-OP1-W3-F8


Depreciation Rate Table

EDWS-FD-OP1-W3-F9

Depreciation Rate Table

8. References

Myanmar Accounting Standard (MAS 3, 11)

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(၂) ပုံသေပိုင်ပစ္စည်းများထိန်းသိမ်းစောင့်ရှောက်ခြင်း

ရန်ကင်းစတင်သောစာရင်းစနစ် YCDC

ဌာန/ရုံး: Department/Office

ပုံသေပိုင်ပစ္စည်းစနစ်: Asset registration


Types of item: _____ Place of asset: _____

Main/Model: _____ Expected useful life: _____

Received date: _____ Annual depreciation rate (%): _____


Received from: _____


No	Date	Item/Subject	Bill No. and date	Cost of asset	Depreciable amount for year of 2000		Residual amount	Remarks
					Kyat / cent	Kyat / cent		
၁	၂	၃	၄	၅	၆	၇	၈	၉

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အသုံးဝင်သက်တမ်းနှင့်တန်းဆင့်ချော့နှုန်းထား (Useful Life) / Depreciation Rate


Sr.no	1th Tier	2nd Tier	Year (useful life)		Depreciation Rate %		Remark
			Min	Max	Min	Max	
၁	မြေ	မက					
၂	ပြင်	Water Conservation forest		30		3.33	
၃	အဆောက်အအုံ	Steel		20		5	
		Brick		5		20	
		Meatall		10		10	
		wood		50		2	
		RC		10		10	
		သစ်		3		33.33	
		ဝါး		50		2	
		အုတ်		10		10	
		သံမဏိ		10		10	
		အခြား		10		10	
		Concrete way		10		10	
၄	ရေစက်အိမ်နှင့်အခြားအဆောက်အအုံ	Low Capacity Pumping House		10		10	
	အစိုးရ	Indoor Sub Station	30	60	3.33	1.7	
		Electro Chlorination Building	30	60	3.33	1.7	
		Pumping Station	30	60	3.33	1.7	
		Compressor House	30	60	3.33	1.7	
		Chamber Building	30	60	3.33	1.7	
		Indoor စက်အားခွံ	30	60	3.33	1.7	
		Outdoor စက်အားခွံ	30	60	3.33	1.7	


	<p style="text-align: center;">အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု) ဘဏ္ဍာရေး ဌာန</p>	SOP ကုန်အမှတ်	EDWS -FD- OP1 -W3-F5
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	<p style="text-align: center;">အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု) ဘဏ္ဍာရေး ဌာန</p>	SOP ကုန်အမှတ်	EDWS -FD- OP1 -W3-F4
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Sr.no	1th Tier	2nd Tier	Year (useful life)		Depreciation Rate %		Remark
			Min	Max	Min	Max	
၉	(Collecting and impounding Reviserviors)	Syphon (MS)	25	50		4	
		Tunnels (RC)			3	2	
		Up Cannel	30	40		3	
		Dividing Well (RC)					
		Well and springs	5	10	20	10	
		Overhead Conductors	10	20	10	5	
		Overhead Device	5	10	20	10	
		Underground Conductors	20	30	5	3	
		Underground Device	5	10	20	10	
		Service Lane	5	10	20	10	
၁၀	Electric Equipment	PVC Insulated Wire	5	10	20	10	
		Flexible Wire	5	10	20	10	
		Control Wire	5	10	20	10	
		Line cables	5	10	20	10	
		High Voltage Transformer	20	25	5	4	
		Step up Transformers	3	5	33	20	
		High Voltage Pump >500KW	10	20	10	5	
		Low Voltage Pump <500KW	5	10	20	10	
		High Voltage Motor >6KV	10	20	10	5	
		Low Voltage Motor <400V	5	10	20	10	
၁၁	Transformer & Pump	High / Low Voltage Starter Panel	3	5	33	20	
		Air Compressor	5	10	20	10	


Sr.no	1th Tier	2nd Tier	Year (useful life)		Depreciation Rate %		Remark
			Min	Max	Min	Max	
6	Bridge	Concrete	25	50		4	
7	ရေသောက်တံခွန် (Reviserviors)	Wood	10	10		10	
		RC ကန်	30	60	3.33	1.67	
		အနည်တိုင်ကန်	30	60	3.33	1.67	
		ရေတံခွန်	30	60	3.33	1.67	
		Reservoirs (Concrete above ground)	50	50	2.00	2.00	
		Reservoirs (Concrete in ground)	50	50	2.00	2.00	
		Head Regulator (RC)	30	60	3.33	1.67	
		Underground Tank	30	60	3.33	1.67	
		Overhead Tank	30	60	3.33	1.67	
		Reviserviors	30	60	3.33	1.67	
		Lake	30	60	3.33	1.67	
		other Intakes (RC)	30	60	3.33	1.67	
		Conduit	30	60	3.33	1.67	
		Intake weir (RC)	30	60	3.33	1.67	
		Intake tower (RC)	30	60	3.33	1.67	
		spill way (RC)	30	60	3.33	1.67	
		Sand setting basin (RC)	30	60	3.33	1.67	
		၈	Channel	Storage Tank (Concrete)	30	60	3.33
Storage Tank (Metal)	30			60	3.33	1.67	
မြောင်းစိုင်း RC ချောင်း	25			35	4	3	
		Syphon (RC)	50	50		2	


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	ခွင့်ပြုသူ	

Sr.no	1th Tier	2nd Tier	Year (useful life) / Depreciation Rate			Remark
			Min	Max	Max	
၁၂	Transformer & Pump	Lift Engine & Pump	10	13	7.69	
		Submersible Motor & Pump	3	5	33.33	20.00
		400V Distribution Panel	5	10	20.00	10.00
		33 KV , Disconnecting Switch	10	20	10.00	5.00
		11 KV , Disconnecting Switch	10	15	10.00	6.67
		33 KV , Drop Out Fuse	3	5	33.33	20.00
		11 KV , Drop Out Fuse	3	5	33.33	20.00
		PT (66/33 KV)	10	20	10.00	5.00
		CT (66/33 KV)	10	20	10.00	5.00
		MOF (33 KV)	3	5	33.33	20.00
၁၅	Station Equipment	Capacitor Bank	2	3	50.00	33.33
		Battery Changer	2	3	50.00	33.33
		Battery Bank	10	10	10.00	10.00
		Water Fountain	2	5	50.00	20.00
		Tube Well Drill machines	3	5	33.33	20.00
		Filter	10	15	10.00	6.67
		(a) Concrete Pipe	25	25	4.00	4.00
		(b) MS Pipe	100	100	1.00	1.00
		(c) CI Pipe	100	100	1.00	1.00
		(d) DI Pipe	25	25	4.00	4.00
၁၆	Attached Pipe /Valve	(e) GI Pipe (4"Ø above)	5	5	20.00	
		(f) GI Pipe (3"Ø below)	50	50	2.00	
		(g) HDPE Pipe	15	15	6.67	
		(h) PVC Pipe	15	15	6.67	

Sr.no	1th Tier	2nd Tier	Year (useful life) / Depreciation Rate			Remark	
			Min	Max	Max		
၁၀	Attached Pipe /Valve	(i) FRP Pipe	10	10	10.0		
		Transmission Valve	15	15	6.7		
		Distribution Valve	15	15	6.7		
		Copper Valve	5	5	20.0		
		Mechanical Valves	15	15	6.7		
		Check Valves	15	15	6.7		
		Butterfly Vave	15	15	6.7		
		Air Valves	15	15	6.7		
		Pipe Joint Machine	3	3	33.3		
		Water Tower	25	25	4.0		
		Overhead Tank	25	25	4.0		
		Pipe Joint Machine	3	3	33.3		
		Meter	5	5	20.0		
		Flow Meter	5	5	20.0		
		Hydrants	25	25	4.0		
၁၁	Electric Line Equipment	Concrete Pole & Fixture	10	20	10	5	
		Iron Lamp Post & Fixture	5	10	20	10	
		Public Light & Fixture	3	5	33.33	20	
		Hight Mast Light & Fixture	3	5	33.33	20	
		Drilling Machine	3	5	33.33	20	
		Wedding Machine	3	5	33.33	20	
		Generator	10	20	10	5	
		Pipe Production Machine	10	20	10	5	
		၁၉	Machinery & Equipment				

	<p style="text-align: center;">အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု) ဘဏ္ဍာရေး ဌာန</p>	SOP ကုဒ်အမှတ်	EDWS -FD- OP1 -W3-F8
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	<p style="text-align: center;">အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု) ဘဏ္ဍာရေး ဌာန</p>	SOP ကုဒ်အမှတ်	EDWS -FD- OP1 -W3-F9
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Sr.no	1th Tier	2nd Tier	Year (useful life) / Depreciation Rate %			Remark
			Min	Max	Max	
J၀	Electric Equipment	Auxiliary Machine	10	20	10	5
		Boiler	10	15	10	6.67
		Tool ,Shop and Ganage equipment	10	15	10	6.67
		Air Con		10		10
		1. UPS (Lot)		15		6.67
J၁	Communications equipment	2. GPRS Router (Lot)		8		12.5
		3. Pressure Transmitter		5		20
		4. Residual Chlorine Analyzer		5		20
		5. PLC Panel (Interface Panel)		5		20
		Balance		5		20
JJ	Vehicles	Distiller		5		20
		Laboratory Equipment		7	20	14.3
		Data Communication Equipment		5	20	14.3
		Aquamarine		5	20	12.5
		Overhead crane		5	20	12.5
		Truck		5	20	12.5
		Mini Truck		5	20	12.5
		Water Boxer		5	20	12.5
		Motor Vehicle		5	20	12.5
		Other Vehicle		10	10	10
Bicycle		8		12.5		

Sr.no	1th Tier	2nd Tier	Year (useful life) / Depreciation Rate %			Remark
			Min	Max	Max	
JR	Tools and appliances	Boat (Fiber , Iron)		3		33.33
		Bicycle		8		12.50
		Boat (Fiber , Iron)		3		33.33
		Tool Equipments		8		12.50
J၄	Furniture and Fixture (Office Equipment)	Water Fountain		10		10.00
		Cupboard		15		6.67
		Table		15		6.67
		Chair		15		6.67
		Computer other		8		12.50
				5	20.00	

Annex-2.D: Customer Management Manual (Draft)

List of materials

- Meter Reading Works Manual
- Collection Work Manual
- SOP (Tariff Collection Work)

Customer Management Manual (Draft)

Meter Reading Works Manual

Tools and materials to be brought for meter reading

- (1) Staff ID.
- (2) Wear full uniform.
- (3) Visit the customer during working hours.
- (4) Politely communicate with customers.
- (5) Bring water tariff invoice and tariff bill while visiting at customer's house.
- (6) Report the Customer Complaint and Information to township officers and HO.
- (7) Meter reading units shall be recorded in YaPa (1)

Meter reading shall follow:

- 1) The meter reading staff carried out meter reading regularly on the specified days and times. The specified number of House Holds must be completed by the specified date and time.
- 2) Meter reading procedure shall be followed by meter reader (procedure specified by the head office and township officer depending on the number of invoices).
- 3) Yapa-1 must be brought while meter reading.

4) Meter reader must wear the required uniform, bring staff ID card and visit the customer during office hours.

- 5) Politely communicate with customers.
- 6) Detail of customer information such as customer name, address, meter number and reading units shall be precisely recorded in Yapa-1.
- 7) In case of customer complaint during meter reading, it shall be reported to respective in-charged officer.

- 8) Collected meter reading data is returned to township office and input in computer system of township office together with computer operator.
- 9) If the current reading unit differs $\pm 40\%$ from previous month's reading unit at the time of meter reading, customer shall be notified about the difference and the case shall also be reported to township officer.

- 10) Meter damage, change of customer category,
- 11) While meter reading, meter reader regularly checks the meter condition, change of customer category and whether there is a room or house consuming water for free.
- 12) If there is any demolition of the building / vacant land despite the regular water bill, the relevant township officer shall be notified about the case. The township officer shall handle the case by following the procedures prescribed by the head office.

Checking/Inspecting the meter while the customer is at the house

- (1) Check the meter number and meter pointer.
- (2) Check the meter by turning the meter while the customer is using water and when not using water.
- (3) If the meter is running when the valve is turned off, confirm with the customer where the leaking pipe is and repair the leaking pipe.
- (4) The most leaking area in most houses is a broken toilet valve and broken pump head. The leaking points must be confirmed with customer and persuade the customer to repair.

(5) The volume of water leaking due to the fault of the customer and the volume of water used after repair shall be calculated and notified together with/to the customer so that the water tariff can be charged.

(6) In case of any irregularities, the Customer Phone Number and event shall be recorded in the Book of Abnormal Content and the relevant departments shall be notified if necessary through the Ward/Township Officer.

Checking/Inspecting the meter while the customer is at the house

(1) Check the meter by turning the meter while the customer is using water and when not using water.

(2) If there is a suspicion of leakage, the necessary information shall be written in the book and submitted to the relevant authorities for inspection.

(3) In case of leakage, if the customer is not present at the house, a notification letter shall be provided to the customer so that himself shall know and confirm.

(4) If it is difficult to notify the customer when he is not at home, Connections must be submitted to the township in charge on a monthly basis.

In case of improper functioning meter while the customer is at home (rising water consumption)

1) Check that the water meter is actually working properly.

2) If the meter is found to be running normally and the customer's water consumption is increasing, the reason for the increase in water consumption shall be discussed with the customer and confirmed.

3) If the meter is found to be increasing after 3 times of every 3 days checking whether the meter is actually working properly or not, the customer must be informed and confirmed whether the meter is broken or not.

4) In the cases of increased water consumption by regular meter operation and by non-regular meter operation; the customer must be notified after checking the meter functioning for 3 times of every 3 days for both cases of increased water consumption.

5) If the category of water connection changes, it shall be confirmed with customer and the water fee shall be changed.

In case of improper functioning meter while the customer is away from house

(1) Check that the water meter is actually working properly.

(2) The customer must be informed in writing that the water consumption is increasing.

(3) It shall be registered in Yapa-1 and a comment shall be made on the list of abnormal condition of water meter.

In the case of significant decline of water consumption

1) Make an enquiry to the customer when the water consumption decreases. The reason shall also be noted in the list of abnormal situations.

2) When the customer responds it is being used normally, check again the meter functioning while using water. If the meter is considered to be malfunctioning, the meter unit must be marked and the meter shall be rechecked.

3) If meter is found to be defective, the customer must be explained that the average consumption unit of previous 3 months will be charged for water tariff. Photographs must be recorded. Finally, customer must be informed that the water meter must be replaced with a new meter.

- 4) When the new meter is replaced, the invoice must be issued starting with the unit '0' (zero) Initial Reading '0' (zero) from the adjacent month.
- 5) Water meter reading staff should also be made aware of that the possibility of declined water consumption can be due to malfunctions of meter and while the customer is not at home.

- 4) When the time comes to read the water meter, make sure that the water meter reading on the House Hold ground is the same as the water meter reading on the water bill.

In the condition after leakage has been repaired

- 1) The leakage shall be monitored after repairing for 3 or 5 days and compared the water consumption before and after the leakage repair.
- 2) The customer shall be informed that the meter unit will be recorded in Yapa-1 and a bill will be issued according to the amount.
- 3) Get the confirmation from customer that she/he knows that the unit included in the water bill is calculated according to the specified principle.
- 4) Take a note down that the unit listed in Yapa-1 needs to be reviewed. In addition, the instability of consumption unit must be listed in the record.

Guidance on meter reading

- 1) Establish a water meter reading date based on the number of bills to be collected in each ward.
- 2) To explain the meter reading date and procedure of meter reading until the meter reading staff understands, and to bring up meter reading staff to be able to explain the design of the water meter reading to the customer through the meter reading staff
- 3) At present, depending on the number of staff and connections in the townships, the water meter shall be read every 1 or 2 months.

Collection Work Manual

Statistic Data Collection

- The data of damage meters and new connection list must be collected and recorded.
- Number of household member of each customer, consumption volume and address shall be stored.
- The customers shall be classified according to the categories such as commercial, domestics, etc.
- Considerations needs to be taken into account in buildings such as monasteries, temples, and other religious compounds to charge water tariff.
- The status of damage meter list shall be distinguished such as meter reading difficulty, meter failure etc.
- If the pipe burst is found or happens, the causes of pipe burst shall be categorized and integrated into the data in accordance with the property boundaries specified by the department.
- The customers, with respect to bill collection, shall be categorized as regular payment customers and non-payment customers so it is to be supportive for billing collection.
- Customers shall be informed that customer is responsible to pay for water loss from pipe burst beyond the meter within customer's territory.
- If the customers whose connections are cut off for a variety of reasons reuse the water or reconnect the connection by themselves without the permission from WRWSA, the case shall be recorded in the Customer Database. Action must be taken in accordance with the procedure.
- The details of non-payment customers and the reasons of non-payment shall be recorded.

Collection Cycle



	Last week of Month	
		Meter reading
		Sending invoice to customers
	10 th Day	10 waiting days after sending notice invoice
	40 th Day	If Customer is absent to pay the bill up to one month, a notice of debt payment will be sent to customer
	70 th Day	If the Customer is still absent for payment upon debt notice, 1 st Warning Letter of water cut off will be sent to customer.
	77-84 th Day	If the Customer is absent for payment upon 1 st Warning Letter, two more Warning Letters (2 nd , 3 rd Warning Letter) will be sent to customers.
	91 st Day	In case of no payment after 3 rd Warning Letter, water cut permit shall be requested from Department.
The activity of water connection cutting off shall be timely reported.		

SOP (Tariff Collection Work)

Table of Contents

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- 2 Instructions for staff of house connection section to issue house connection permit
- 3 Instructions for supervision on house connection installation of new customer who has got house connection permit
- 4 Instructions for bill collector to collect water charges from new connection
- 5 Instructions for meter readers in township office
- 6 Instructions for meter readers to tackle abnormal water consumption cases
- 7 Instructions for average water tariff collection for damaged meter
- 8 Instructions for depositing of water charges
- 9 Instructions for receivable/debt collection management

10 Yapa Ito8

 	Yangon City Development Committee Water Resource and Water Supply Authority Engineering Department (Water & Sanitation)	SOP Code No: <i>EDWS-FD-071</i> Version No: <i>01</i> Effective Date: Pages: <i>Page 1 of 2</i> Developer: <i>AE</i> Verifier: <i>DYZE</i> Approval:
 <i>Finance</i> Division Section

1. Duties and Responsibilities of Human Resource Section

Directives to fulfill the needs of customer

Directives on full water tariff collection

2. Objectives & Scope

To gain customers— trust on water supply works

To meet customers— satisfaction

To collect water tariff fully and to carry out water supply activities with water charges revenueundersand their duties and responsibilities

This SOP is disclosed to only staff of Finance Division under Water Resource and Water Supply Authority.

This SOP is applicable only for customers and staff who directly deal with customers.

3. Abbreviations and definitions

- 1) (Ya Pha) *Water Charges Accounting/Registration Record*
- 2) (Hta Sa) *Governmental Accounting Record*
- 3) AA *Administrative Authority*
- 4) CC *Completion Certificate*
- 5) WO *Work Order*
- 6) PAE *Plinth Area Estimate*

no abbreviation

	Engineering Department (Water & Sanitation)			SOP Code No: EDWS-OP1-A1
	..... Division	..... Section		Version No: 00
				Effective Date: April 5, 2021
				Pages: 2 of 5

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Duties and responsibilities of staff directly dealing with customers	Township officer, Deputy township officer, House connection staff and customerFinance officer and Accountant	Township officer, Section in-charged, customersFinance Office
3	Receiving water charges and other income	Finance officer and Accountant	Finance Officer

5. Procedure

- 1) *Planning and projecting connections list of each township to improve water supply and distribution.*
- 2) *Regular inspection for NRW prevention in order to fully deliver water to customers.*
- 3) *Persuading and coordinating with customers to alter their flat rate connections into meter connections*
- 4) *Providing full service for new customers*
- 5) *Raising customers— awareness to have the sense of responsibility to pay water charges for their consumption*
- 6) *To conduct public relation activities for the customers to understand current operation and activities of EDWS to meet the demand of customers— need and to supply clean and adequate water to customers.*
- 7) *To maintain the good condition of customer meter to obtain accurate meter reading units as the customer—s consumption.*

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- 8) *Providing services that water charges can be easily and conveniently paid by the customers.*
- 9) *New customer who wants to access water from WRWSA shall follow the directives as per EDWS-CSS-OP1-W1.*
- 10) *Staff of House connection section shall follow this directive EDWS-CSS-OP1-W2 to issue House Connection Permit for new customer.*
- 11) *The customer with house connection permit*

EDWS-FD-OP1-W2 shall be followed in disbursement of expense, accounting and financing

5.3 EDWS-FD-OP1-W3 shall be followed in managing fixed assets list.

6. Related Documents

- EDWS-FD-OP1-W1 Instruction for Receiving water charges and other income*
- EDWS-FD-OP1-W2 Instruction for disbursement of expense, accounting and financing*
- EDWS-FD-OP1-W3 Instruction for managing fixed assets list*

7. Related Forms


No

8. References

- 1) *Myanmar Financial Regulations Planning and Finance Ministry Order No. 35/2017 1378, 5th Waxing of Tagu (2017, 1st April)*
2. *Myanmar Accounting Standards 3, 11*

9. Attachments

No

	Yangon City Development Committee Water Resource and Water Supply Authority Engineering Department (Water & Sanitation)	SOP Code No:	EDWS-CSS-OP1-W1
		Version No:	01
		Effective Date:	4/04/2019
		Pages:	Page 1 of 5
		Developer	Daw Aye Aye Mar
		Verifier	DYCE
		Approval	CE

1. Framework

Directives for new connection applicants/customers

2. Objectives & Scope

For easy and convenient service for new connection applicant/customer

This SOP is applicable only for township officers and staff of House Connection section.

3. Abbreviations and definitions

- no abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Service for new connection application of New Customer	House Connection Staff Respective township officer	Township Officer Head of House connection section

5. Procedure

Steps of New connection application

- The following procedure shall be applied when a new customer applies a new connection at township office “
 - Fill the application form at Township office (EDWS-HC-OP-F1)

	Engineering Department (Water & Sanitation) Division Section	SOP Code No:	EDWS-OP1-A1
		Version No:	00
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2) Make sure applicant—s desired connection category.

3) Township officer is to inspect the ground situation for the availability of water access

4) Follow item 5.2 and 5.3 of EDWS-HC-OP-W1 to EDWS-HC-OP-W5 during ground inspection by township officer

5) Inform the customer if the water access is available (after ground inspection) in order to proceed the application process

5.2 The following procedure shall be done if water access is available for new applicant.

- Obtain the supporting documents required from the applicant in accordance with Article 5.4 of EDWS-HC-OP-W5 in order to submit those to EDWS to allow the applicant water connection permit (To start counting Work Day from the first day of process)

2) The applicant is to pay house connection fee and meter cost

3) Water meter is to be taken from township office and meter installation shall be carried out within 3 days.

4) House connection installation shall be systematically performed by following EDWS-D&Ts-OP1-W1

5) Meter installation and connection registration at township office shall be systematically carried out according to EDWS-D&T-OP3-W1

5.3 The following procedure shall be proceeded to get house connection permit

- District office shall submit the new connection application with all required supporting documents to HO while house connection installation is being carried out on ground.

2) To proceed the application in accordance with EDWS-HC-Op-W1 to EDWS-HS-OP-W5 until the permit is issued.

6. Related Documents

EDWS-HC-OP-W1 Procedure of temporary connection permit

EDWS-HC-OP-W2 Procedure of water connection permit

	Engineering Department (Water & Sanitation) Division Section		SOP Code No: EDWS-OP1-A1
			Version No: 00
			Effective Date: April 5, 2021
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- EDWS-HC-OP-W3 Procedure of old house water connection permit
- EDWS-HC-OP-W4 Procedure of secondary/extension water connection permit
- EDWS-HC-OP-W5 Procedure of water connection permit for excess consumption
(need to be confirmed)
- EDWS-D&Ts-OP1-W1 Instruction for house connection installation
- EDWS-D&Ts-OP3-W1 Instruction for meter installation

7. Related Forms

House connection application form (EDWS-HC-OP-A1)

8. References

No

9. Attachments

No

	Yangon City Development Committee Water Resource and Water Supply Authority Engineering Department (Water & Sanitation) Division Section		SOP Code No: EDWS-CSS-OP1-W2
			Version No: 01
			Effective Date: 6/04/2019
	Pages: Page 1 of 2		
	Developer Daw Aye Aye Mar		
	Verifier DMYE		
Approval CE			

1. Framework

Instructions for staff of house connection section to issue house connection permit

2. Objectives & Scope

To issue house connection permit by House connection section

This SOP is applicable only for staff of House Connection section and Customer Service section.

3. Abbreviations and definitions

- no abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Works for water connection permit of each category (1) Temporary connection permit (2) New connection permit (3) Old house connection permit (4) Secondary connection permit (5) Water connection permit for excess consumption	Staff of House Connection section Staff of Customer Service section	Head of House connection section Head of Customer Service section

	Engineering Department (Water & Sanitation)		SOP Code No: EDWS-OP1-A1
 Division Section	Version No: 00
	Effective Date: April 5, 2021
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5. Procedure

- 5.1 Proceeding for connection permit according to the permit category of EDWS
 - 1) Proceed the connection application submitted by township office by following article 5.1 of EDWS-HC-OP according to connection category
 - 2) Get the approval sign from EE (House connection section) after scrutinizing the application and completing drawing, then sent it to Customer Service section
 - 3) Then, Customer Service section shall do the followings within 3 days “
 - i. inputting ‘Data of approved application’ on Online Water Supply Permit System,
 - ii. recording the drawing in the program,
 - iii. getting House Connection Permit from House connection section
 - iv. getting approval sign and stamp of ACE (Water Supply) on permit

6. Related Documents

EDWS-HC-OP Procedure of house connection permit

7. Related Forms


*House connection application form (EDWS-HC-OP-F1)
House connection Permit (EDWS-HC-OP-A1)*

8. References

No

9. Attachments

No

	Yangon City Development Committee		SOP Code No: EDWS-CSS-OP1-
	Water Resource and Water Supply Authority		WS
	Engineering Department (Water & Sanitation)		Version No: 01
	.....Customer Service..... Division	..... Section	Effective Date: 6/04/2019
	.....	.....	Pages: Page 1 of 2
	.....	.....	Developer DWAE
.....	.....	Verifier DWAE	Approval CE

1. Framework

Instructions for supervision on house connection installation of new customer who has got house connection permit.
Directives for new customer with house connection permit to follow for house connection installation

2. Objectives & Scope

To follow by new customer for house connection

This SOP is applicable only for House Connection staff from townships and new customers

3. Abbreviations and definitions

- no abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	To supervise the installation of house connection to be systematic	Township NRW staff	Township officer
2	Instructions for customer	customers who got house connection permit	customers

	Engineering Department (Water & Sanitation)		SOP Code No: EDWS-071-A1
	..... Division	..... Section	Version No: 00
	.....	.....	Effective Date: April 5, 2021
	.....	.....	Pages: 2 of 2

5. Procedure

- 1) Customer who has received house connection permit shall pay the water meter cost and service fee specified by the Committee and pay all cost for the connection line from distribution pipe to house connection.
- 2) Customer has to pay the specified meter maintenance fee for water meter leased by EDWS.
- 3) Customer has to pay the cost for meter replacement due to life span expiration of meter, broken meter, and meter lost or stolen.
- 4) Customer shall do house connection installation under supervision of in-charged supervisor of EDWS.
- 5) Customer must not do the following “
 - (i) Breaking the meter
 - (ii) Taking out some parts of meter
 - (iii) Replacing the meter
 - (iv) Changing the meter
 - (v) Connecting water pipe between water meter and distribution pipe line)
- 6) Customer is responsible to take care of the meter.

6. Related Documents

No

7. Related Forms


No

8. References

1. *YCDC Regulation*

9. Attachments

No

	Yangon City Development Committee		SOP Code No: EDWS-CSS-071-
	Water Resource and Water Supply Authority		<i>W4</i>
	Engineering Department (Water & Sanitation)		Version No: 01
	.....<i>Customer Service</i> Division		Effective Date: 16/04/2019
	.....<i>Water</i> Section		Pages: Page 1 of 2
	.....<i>Water</i> Section		Developer <i>DWZE</i>
..... <i>Water</i> Section		Verifier <i>DWZE</i>	
..... <i>Water</i> Section		Approval <i>CE</i>	

1. Framework

Instructions for bill collector to collect water charges from new connection

2. Objectives & Scope

To collect water charges from new connection

This SOP is applicable only for Bill collection staff from townships

3. Abbreviations and definitions

- *No abbreviation*

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Bill collection	Township billing & Collection staff	Township officer

5. Procedure

- 1) Register the new customer in customer data of township office upon the completion of new house connection installation. Submit the data update to HO in order to start bill issuance.
- 2) Customer who has already completed the connection installation and not consumed water yet must also be registered in Computer Section.

	Engineering Department (Water & Sanitation)		SOP Code No: EDWS-CSS-OP1-
	..... Division	.....	W4
	..... Section	.....	01
	.....	.....	6-June-2019
		Pages:	2 of 2

- 3) Meter readers must, monthly, inspect the connections that are registered in Computer section but not consumed water yet.
- 4) Meter readers shall perform as the directions of EDWS if the connection does not consume water for mth/yr since installation.
- 5) To issue the bill of new connections, the copy of new connection permit shall be submitted to Computer section and countercheck the new connection list, then get approval from Computer section.
- 6) To issue the bill of new connections, the new connection list must be submitted to Computer section along with meter number [EDWS-MS-OP-F4].

6. Related Documents

No

7. Related Forms


No

8. References

No

9. Attachments

No

	Yangon City Development Committee		SOP Code No: EDWS-CSS-OP1-
	Water Resource and Water Supply Authority		W5
	Engineering Department (Water & Sanitation)		Version No: 01
	..... Division		Effective Date: 6/04/2019
	..... Section		Pages: Page 1 of 2
	.....		Developer Daw Aye Aye Mar
.....		Verifier DMYE	
.....		Approval	CE

1. Framework

Instructions for meter readers in township office

2. Objectives & Scope

To follow by meter readers in monthly meter reading

This SOP is applicable only for meter readers in township offices

3. Abbreviations and definitions

- *No abbreviation*

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Monthly Duties and responsibilities for meter reading in township	Township meter readers	Township officer

5. Procedure

- 1) In the township, the respective staff shall conduct the meter reading for their assigned ward in accordance with EDWS-D & Ts-OP2-W1.
- 2) Meter readers must comply with EDWS-CS-OP-W1 to obtain the required information for Demand submission while meter reading on the ground.

	Engineering Department (Water & Sanitation) Division Section			SOP Code No: EDWS-CSS-OP-W5
				Version No: 00
				Effective Date: April 5, 2021
				Pages: 2 of 2

3) Meter readers shall regularly do meter condition inspection by following Meter reading manual prescribed by Customer service section.

6. Related Documents

- EDWS-D&Ts-OP2-W1 Rules for Meter reading*
- EDWS-CS-OP-W1 Monthly billing*
- Meter Reading Manual*

7. Related Forms


- (YaPa -1) Monthly Meter reading units recording form*

8. References

No

9. Attachments

No

	Yangon City Development Committee Water Resource and Water Supply Authority Engineering Department (Water & Sanitation) Customer Service... Division Section			SOP Code No: EDWS-CSS-OP1-W6
				Version No: 01
				Effective Date: 16/04/2019
				Pages: Page 1 of 2
				Developer DWAE
				Verifier DWAE
			Approval CE	

1. Framework

Instructions for meter readers to tackle abnormal water consumption cases

2. Objectives & Scope

To follow by meter readers in monthly meter reading

This SOP is applicable only for meter readers in township offices

3. Abbreviations and definitions

- No abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Meter Reading	Township meter readers Ward in-charged	Township officer

5. Procedure

- 1) Meter reader shall bring detail customer data form [EDWS-CS-OP1-W6-F1] when meter reading.
- 2) If the current unit is $\pm 40\%$ more or less than regular usage, meter condition shall be inspected.

	Engineering Department (Water & Sanitation)		SOP Code No: <i>EDWS-CSS-OP-W6</i>
	..... Division	..... Section	Version No: <i>00</i>
	.....	.....	Effective Date: <i>April 5, 2021</i>
	.....	.....	Pages: <i>2 of 2</i>

- 3) To inspect meter function while customer is at home, Meter inspection shall be done according to meter reading manual.
- 4) To inspect meter function while customer is not at home, Meter inspection shall be done according to meter reading manual.
- 5) To inspect abnormal consumption while customer is at home, meter inspection shall be done according to meter reading manual.
- 6) Inspection on leakage repair completion shall be carried out in accordance with the meter reading manual.

6. Related Documents

Meter Reading Manual

7. Related Forms


EDWS-CS-OP1-W6-F1 (*YaPa -1*)

8. References

No

9. Attachments

No

	Yangon City Development Committee		SOP Code No: <i>EDWS-CSS-OP1-W7</i>
	Water Resource and Water Supply Authority		Version No: <i>01</i>
	Engineering Department (Water & Sanitation)		Effective Date: <i>16/04/2019</i>
	.....<i>Customer Service</i> Division	..... Section	Pages: <i>Page 1 of 2</i>
	.....	.....	Developer <i>DWAE</i>
	.....	.....	Verifier <i>DWAE</i>
	.....	.....	Approval <i>CE</i>

1. Framework

Instructions for average water tariff collection for damaged meter

2. Objectives & Scope

To fully collect water charges of damaged meter connection
This SOP is applicable only for bill collectors of township offices

3. Abbreviations and definitions

- No abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Bill collection while the meter is damaged	Bill collection staff in Township	Township officer

5. Procedure

- 1) Meter reader shall check the meter condition at the time of meter reading by following the article 5.3 (d,e) of EDWS-D&Ts-OP2 in order to collect water tariff fully.
- 2) Every meter reader shall register the consumption unit and water tariff of each customer, in their respective ward, in EDWS-CSS-OP1W7-F1/ Customer Service Management Program upon the completion of meter reading.

	Engineering Department (Water & Sanitation)			SOP Code No: EDWS-CSS-OP-W7
	..... Division			Version No: 01
	..... Section			Effective Date: 6-6-2019
				Pages: 2 of 2

- 3) Water charges collection during operation for meter replacement due to meter failure (damage) shall be performed in accordance with EDWS-D & Ts-OP2 5.3.
- 4) Customers shall be negotiated for meter replacement not to be more than 3 months of average consumption invoice due to meter damage.
- 5) Meter replacement of damage meter for high consumption customer shall be carried out within one month.

6. Related Documents

EDWS-D&Ts-OP2 Instructions for meter condition inspection and collection of average consumption in case of meter damage

7. Related Forms


EDWS-CSS-OP1-W7-F1 (YaPa -2)

8. References

No

9. Attachments

No

	Yangon City Development Committee			SOP Code No: EDWS-CSS-OP1-W7
	Water Resource and Water Supply Authority			Version No: 01
	Engineering Department (Water & Sanitation)			Effective Date: 6/06/2019
	.....<i>Cashier</i> Division			Pages: Page 1 of 2
	..... Section			Developer DWAE
	.....			Verifier DWAE
	.....			Approval CE

1. Framework

Instructions for depositing of water charges

2. Objectives & Scope

To collect full water tariff

This SOP is applicable only for cashier (township staff) and township officer

3. Abbreviations and definitions

- *No abbreviation*

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Water charges collection and depositing	Cashiers (Township staff) and bill collectors	Township officer

5. Procedure

1) Water tariff/charges collection shall be carried out in line with article 5.3 (a,b) of EDWS-D&Ts-OP2.

2) A detailed list of collected water charges must be completed as directed in EDWS-CS-OP1-W8-F1 (Yapa 4)

	Engineering Department (Water & Sanitation)		SOP Code No: EDWS-CSS-OP-
	..... Division		W8
	..... Section		01
			4-4-2019
		Pages:	2 of 2

- 3) The e-challan of daily revenue will be issued at township office and total daily revenue will be deposited at AYA bank and City Bank in respective township.
- 4) The deposit challan and EDWS-CS-OP2-W8-F1 will be submitted to Income section under Finance Division.
- 5) Non-regular-payment customers must be separately managed from Collection System.
- 6) Debt collection plan must be made to claim the receivable from non-payment customers for the debt of remaining month to pay.
- 7) If the daily revenue cannot be deposited at the bank in time, in-charged staff shall fill it in EDWS-CS-OP1-W8-F2 and submit the form and revenue to YCDC Township Administrator (EO).

6. Related Documents

EDWS-D&Ts-OP2 Instructions for water charges collection

7. Related Forms


EDWS-CS-OP1-W8-F1 (YaPa -4) (Scan)
 EDWS-CS-OP1-W8-F2 Hta Sa - 6

8. References

No

9. Attachments

No

	Yangon City Development Committee		SOP Code No: EDWS-CSS-OP1-
	Water Resource and Water Supply Authority		W1
	Engineering Department (Water & Sanitation)		01
			4/04/2019
		Pages:	Page 1 of 2
		Developer	Daw Aye Aye Mar
		Verifier	DYZE
		Approval	CE

1. Framework

Instructions for receivable/debt collection management

2. Objectives & Scope

To manage debt collection

This SOP is applicable only for bill collectors and non-payment customers

3. Abbreviations and definitions

- No abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Receivable/debt collection	Township bill collector	Township officer

5. Procedure

- 1) In billing collection, the bill receipt will be handed over to customer if customer pays water charges at the time of collection, and the bill invoice will be given to customer if customer does not pay water charges at once.
- 2) The customer shall pay water charges within 10 days after receiving bill invoice.
- 3) If the customer is absent to pay water charges up to one month, township officer shall conduct sending notice letter to payment-absent customer.

**Annex-2.E: Standard Operating Procedures (SOP) of All Sections of
WRAWSA (List only)**

SOP Lists of WRAWSA

Sr. by Sec.	Sr.	Facility Name/Section	SOP Title	SOP Code	Preparation Status	SOP Preparation Status		
						Burumese	English done	
1	1	Yegu	Main SOP	EDWS-YPS-OP	Completed	0	0	
	2		Working Instruction of Safety	EDWS-YPS-OP-W1	Completed	0	0	
	3		Working Instruction of Admin	EDWS-YPS-OP -W2	Completed	0	0	
2	4	Yegu P/S -1	Operation Procedure of Yegu Pumping Station No.1	EDWS-YPS-OP1	Completed	0	0	
	5		Maintenance Procedure of Yegu Pumping Station No.1	EDWS-YPS-MP1	Completed	0	0	
	6		Working Instruction of Operation of Yegu Pumping Station No.1	EDWS-YPS-OP1-W1	Completed	0	0	
	7		Working Instruction of Maintenance of Yegu Pumping Station No.1	EDWS-YPS-MP1-W1	Completed	0	0	
	8		Daily Checklist Record Form (PS 1)	EDWS-YPS-MP1-F1	Completed	0	0	
	9		Weekly Checklist Record Form (PS 1)	EDWS-YPS-MP1-F2	Completed	0	0	
	10		Monthly Checklist Record Form (PS 1)	EDWS-YPS-MP1-F3	Completed	0	0	
	11		Annual Checklist Record Form (PS 1)	EDWS-YPS-MP1-F4	Completed	0	0	
	3	12	Yegu P/S -2	Operation Procedure of Yegu Pumping Station No.2	EDWS-YPS-OP2	Completed	0	0
13			Maintenance Procedure of Yegu Pumping Station No.2	EDWS-YPS-MP2	Completed	0	0	
14			Working Instruction of Operation of Yegu Pumping Station No.2	EDWS-YPS-OP2-W1	Completed	0	0	
15			Working Instruction of Maintenance of Yegu Pumping Station No.2	EDWS-YPS-MP2-W1	Completed	0	0	
16			Daily Checklist Record Form (PS 2)	EDWS-YPS-MP2-F1	Completed	0	0	
17			Weekly Checklist Record Form (PS 2)	EDWS-YPS-MP2-F2	Completed	0	0	
18			Monthly Checklist Record Form (PS 2)	EDWS-YPS-MP2-F3	Completed	0	0	
19			Annual Checklist Record Form (PS 2)	EDWS-YPS-MP2-F4	Completed	0	0	
20			Pump Operation Record	Yegu P/S	Completed	0	0	
21			Repair and maintenance Record (Log books)	Yegu P/S	Completed	0	0	
22			Monthly Report	Yegu P/S Office	Completed	0	0	
23		Performance Indicator (PI Data) Form	EDWS-YPS-OP1-F1	Completed	0	0		
4	24	Electro Chlorination Plant	Operation Procedure of Yegu Chlorine Disinfection Facility	EDWS-YPS-OP3	Completed	0	0	
	25		Maintenance Procedure of Yegu Chlorine Disinfection Facility	EDWS-YPS-MP3	Completed	0	0	
	26		Working Instruction of Operation of Yegu Chlorine Disinfection Facility	EDWS-YPS-OP3-W1	Completed	0	0	
	27		Working Instruction of Maintenance of Yegu Chlorine Disinfection Facility	EDWS-YPS-MP3-W1	Completed	0	0	
	28		Daily Checklist Record Form (Electro Chlorination Plant)	EDWS-YPS-MP3-F1	Completed	0	0	
	29		Monthly Checklist Record Form (Electro Chlorination Plant)	EDWS-YPS-MP3-F2	Completed	0	0	
	30		Annual Checklist Record Form (Electro Chlorination Plant)	EDWS-YPS-MP3-F3	Completed	0	0	
	31		Dosing Pump Control Chart	EDWS-YPS-OP3-A1	Completed	0	0	
	32		Salt Consumption Ledger Record	Yegu P/S Office	Completed	0	0	
	33		Sodium Hydroxide Consumption Ledger Record	Yegu P/S Office	Completed	0	0	
	34		Sodium Carbonate Consumption Ledger Record	Yegu P/S Office	Completed	0	0	
	35		Electro Chlorinator Operation Record	Yegu P/S Office	Completed	0	0	
	36		Electro Chlorinator Repair and Maintenance Record (log book)	Yegu P/S Office	Completed	0	0	
	5	37	SCADA System	Operation Procedure of Yegu SCADA System	EDWS-YPS-OP4	Completed	0	0
38			Maintenance Procedure of Yegu SCADA System	EDWS-YPS-MP4	Completed	0	0	
39			Working Instruction of Operation of Yegu SCADA System	EDWS-YPS-OP4-W1	Completed	0	0	
40			Working Instruction of Maintenance of Yegu SCADA System	EDWS-YPS-MP4-W1	Completed	0	0	
41			Daily Report Compilation	EDWS-YPS-MP4-F1	Completed	0	0	
42			Sim Card Recharged/Top-up record	Yegu P/S Office	Completed	0	0	
6	43	HRD Section	Main SOP	EDWS-HRD-OP	Completed	0	0	
	44		HRD KPI Format	EDWS-HRD-OP-F1	Completed	0	0	
	45		Training Preparation	EDWS-HRD-OP-W1	Completed	0	0	
	46		Training Needs Questionnaires	EDWS-HRD-OP-W1-F1	Completed	0	0	
	47		Training Implementation	EDWS-HRD-OP-W2	Completed	0	0	
	48		Schedule of Training Preparation	EDWS-HRD-OP-W2-F1	Completed	0	0	
	49		Trainers' Feedback	EDWS-HRD-OP-W2-F2	Completed	0	0	
	50		Trainees' Feedback	EDWS-HRD-OP-W2-F3	Completed	0	0	
	7	51	Computer Section	Instructions to issue water bills	EDWS-CS-OP1	Completed	0	0
		52		Instructions of monthly meter reading in Townships	EDWS-CS-OP1-W1	Completed	0	0
53			Monthly meter reading record form	EDWS-CS-OP1-F1	Completed	0	0	
54			Form of monthly water charges bill	EDWS-CS-OP1-F2	Completed	0	0	
55			Instructions to submit demand for monthly bill issuing (Yapha 1)	EDWS-CS-OP1-W4	Completed	0	0	
56			Instructions for Customer Data inputting in Computer system	EDWS-CS-OP1-W5	Completed	0	0	
57			Instructions to issues monthly meter bills (Yapha 3)	EDWS-CS-OP1-W6	Completed	0	0	
58			Instructions to reissue the error bills	EDWS-CS-OP1-W7	Completed	0	0	
59			Monthly meter reading record form	EDWS-CS-OP1-W1-F1	Completed	0	0	
60			Water Connection Permit	EDWS-CS-OP1-W4-A1	Completed	0	0	
61			Water Connection Permit	EDWS-CS-OP1-W4-A2	Completed	0	0	
62			Monthly meter readings record form	EDWS-CS-OP1-W4-F1	Completed	0	0	
63			Water Bill	EDWS-CS-OP1-W4-F2	Completed	0	0	
64			Form of no. of bill approved (Yapha 6)	EDWS-CS-OP1-W4-F3	Completed	0	0	
65			Data Server Operation Setp 1	EDWS-CS-OP1-W5-A1	Completed	0	0	
66			Data Server Operation Setp 2	EDWS-CS-OP1-W5-A2	Completed	0	0	
67			Data Server Operation Setp 3	EDWS-CS-OP1-W5-A3	Completed	0	0	
68			Data Server Operation Setp 4	EDWS-CS-OP1-W5-A4	Completed	0	0	
69			Data Server Operation Setp 5	EDWS-CS-OP1-W5-A5	Completed	0	0	
70			Data Server Operation Setp 6	EDWS-CS-OP1-W5-A6	Completed	0	0	
71			Data Server Operation Setp 7	EDWS-CS-OP1-W5-A7	Completed	0	0	
72		Data Server Operation Setp 8	EDWS-CS-OP1-W5-A8	Completed	0	0		
73		Data Server Operation Setp 9	EDWS-CS-OP1-W5-A9	Completed	0	0		
74		List of Consumption units and water charges of customers	EDWS-CS-OP1-W6-A1	Completed	0	0		
75		Form of monthly water charges bill	EDWS-CS-OP1-W6-F1	Completed	0	0		
76		Form of no. of bill approved (Yapha 6)	EDWS-CS-OP1-W6-F2	Completed	0	0		
77		Request form to reissue the bill (township to HO)	EDWS-CS-OP1-W7-A1	Completed	0	0		
78		Form of monthly water charges bill	EDWS-CS-OP1-W7-F1	Completed	0	0		
8	79	Central Laboratory	Admin SOPs					
	80		Water Quality Monitoring	EDWS-LAB-OP1	Completed	0	0	
	81		Daily Duty	EDWS-LAB-OP1-W1	Completed	0	0	
	82		Weekly Duty	EDWS-LAB-OP1-W2	Completed	0	0	
	83		Monthly Duty	EDWS-LAB-OP1-W3	Completed	0	0	
	84		Sampling & Storage	EDWS-LAB-OP1-W4	Completed	0	0	
	85		Instruction for Laboratory (Dos & Don't)	EDWS-LAB-OP1-W5	Completed	0	0	
	86		Chemical Handling	EDWS-LAB-OP1-W6	Completed	0	0	
	87		Meter Operation	EDWS-LAB-OP1-W7	Completed	0	0	

88		Safety	EDWS-LAB-OP1-W8	Completed	0	0
89		Analysis SOPs				
90		EC (Electrical Conductivity)	EDWS-CL-AP-W-2	Completed	0	0
91		TDS	EDWS-CL-AP-W-3	Completed	0	0
92		Salinity	EDWS-CL-AP-W-4	Completed	0	0
93		Color	EDWS-CL-AP-W-5	Completed	0	0
94		Turbidity (HANNA)	EDWS-CL-AP-W-6	Completed	0	0
95		Portable Turbidity (HANNA)	EDWS-CL-AP-W-6	Completed	0	0
96		Suspended Solid	EDWS-CL-AP-W-7	Completed	0	0
97		Jar Test	EDWS-CL-AP-W-8	Completed	0	0
98		Total Hardness	EDWS-CL-AP-W-9	Completed	0	0
99		Calcium	EDWS-CL-AP-W-10	Completed	0	0
100		Total Alkalinity	EDWS-CL-AP-W-11	Completed	0	0
101		Chloride	EDWS-CL-AP-W-12	Completed	0	0
102		Maganese	EDWS-CL-AP-W-13	Completed	0	0
103		Iron (Fe)	EDWS-CL-AP-W-14	Completed	0	0
104		Nitrate-Nitrogen (NO ₃ -N)	EDWS-CL-AP-W-15	Completed	0	0
105		Nitrate-Nitrogen (NO ₂ -N)	EDWS-CL-AP-W-16	Completed	0	0
106		Ammonia (NH ₃ -N)	EDWS-CL-AP-W-17	Completed	0	0
107		Sulphate (SO ₄ -2-)	EDWS-CL-AP-W-18	Completed	0	0
108		Phosphorous (PO ₄ 3-)	EDWS-CL-AP-W-19	Completed	0	0
109		Lead (Pb)	EDWS-CL-AP-W-20	Completed	0	0
110		Zinc	EDWS-CL-AP-W-21	Completed	0	0
111		Arsenic (Portable Test)	EDWS-CL-AP-W-22	Completed	0	0
112		Phosphorous (Total LR)	EDWS-CL-AP-W-23	Completed	0	0
113		Phosphorous (Total HR)	EDWS-CL-AP-W-24	Completed	0	0
114		Nitrogen, Total LR (0.5 to 25 mg/L)	EDWS-CL-AP-W-25	Completed	0	0
115		Nitrogen, Total LR (1 to 16 mg/L)	EDWS-CL-AP-W-26	Completed	0	0
116		Nitrogen, Total LR (2 to 150 mg/L)	EDWS-CL-AP-W-27	Completed	0	0
117		Residual Chlorine	EDWS-CL-AP-W-28	Completed	0	0
118		Quanti Tray	EDWS-CL-AP-W-29	Completed	0	0
119		Total Coliform & Fecal Coliform	EDWS-CL-AP-W-30	Completed	0	0
120		Equipment SOPs				
121		pH Calibration for Mettler Toledo Brand	EDWS-SuD-EP-WI-1	Completed	0	0
122		EC Calibration for Mettler Toledo Brand	EDWS-SuD-EP-WI-2	Completed	0	0
123		Balance	EDWS-SuD-EP-WI-3	Completed	0	0
124		Oven	EDWS-SuD-EP-WI-4	Completed	0	0
125		Desiccator	EDWS-SuD-EP-WI-5	Completed	0	0
126		Measurement of Turbidity (HANNA)	EDWS-SuD-EP-WI-6	Completed	0	0
127		DO Meter	EDWS-SuD-EP-WI-7	Completed	0	0
128		U-50 Meter	EDWS-SuD-EP-WI-8	Completed	0	0
129		Jar Test (Laboratory Flocculator)	EDWS-SuD-EP-WI-9	Completed	0	0
130		DR-6000 (UV Spectrophotometer)	EDWS-SuD-EP-WI-10	Completed	0	0
131		Fume Hood	EDWS-SuD-EP-WI-11	Completed	0	0
132		DRB 200 Reactor (Digester)	EDWS-SuD-EP-WI-12	Completed	0	0
133		Burette	EDWS-SuD-EP-WI-13	Completed	0	0
134		Quanti-Tray Sealer Plus	EDWS-SuD-EP-WI-14	Completed	0	0
135		UV-Viewing Cabinet	EDWS-SuD-EP-WI-15	Completed	0	0
136		Incubator	EDWS-SuD-EP-WI-16	Completed	0	0
137		Auto Clave	EDWS-SuD-EP-WI-17	Completed	0	0
9	Mini Labs	Mini Lab's SOP	EDWS-LAB-OP2	Completed	0	0
139		pH measurement instruction	EDWS-LAB-OP1-W1	Completed	0	0
140		EC measurement instruction	EDWS-LAB-OP1-W2	Completed	0	0
141		Salinity measurement instruction	EDWS-LAB-OP1-W3	Completed	0	0
142		Total Dissolved Solid measurement instruction	EDWS-LAB-OP1-W4	Completed	0	0
143		Jar Test measurement instruction	EDWS-LAB-OP1-W5	Completed	0	0
144		pH measurement instruction for mini lab	EDWS-LAB-OP2-W1	Completed	0	0
145		Turbidity measurement instruction for mini lab	EDWS-LAB-OP2-W2	Completed	0	0
146		Color measurement instruction for mini lab	EDWS-LAB-OP2-W3	Completed	0	0
147		Chlorine measurement instruction for mini lab	EDWS-LAB-OP2-W4	Completed	0	0
148		Daily activities instructions in the lab.	EDWS-LAB-OP2-W5	Completed	0	0
149		Instruction for taking water sample	EDWS-LAB-OP2-W6	Completed	0	0
10	Pipe Sections (Transmissio	Duties and Responsibilities of Transmission Pipe Sections	EDWS-TPS-OP	Drafted	0	0
151		Daily Pipe Inspection Record	EDWS-TPS-OP-A1	0	0	0
152		Standards of Backfilling, paving thickness based on pipe diameter	EDWS-TPS-OP-A2	0	0	0
153		Regular Inspection Record	EDWS-TPS-OP-F1	0	0	0
154		Valve Operation Record	EDWS-TPS-OP-F2	0	0	0
155		Record of Pipe Burst repair	EDWS-TPS-OP-F3	0	0	0
156		Instruction for Transmission pipe inspection and maintenance	EDWS-TPS-OP-W1	0	0	0
157		Instruction for Transmission pipe repair	EDWS-TPS-OP-W2	0	0	0
158		Instruction for pressure control of Transmission pipe	EDWS-TPS-OP-W3	0	0	0
159		Instruction for the development of Transmission pipeline map	EDWS-TPS-OP-W4	0	0	0
160		Instruction for Transmission Pipe Extension	EDWS-TPS-OP-W5	0	0	0
11	Gyophyu Reservoir	Pump Operation	EDWS-GR-OP1	Drafted	0	0
162		Maintenance instruction	EDWS-GR-OP1-W1	Drafted	0	0
163		Pump operation instruction	EDWS-GR-OP1-W2	Drafted	0	0
164		Filteration basin operation instruction	EDWS-GR-OP1-W3	Drafted	0	0
165		Gyophyu pipeline maintenace instruction	EDWS-GR-OP1-W4	Drafted	0	0
166		Electrical & mechanical maintenance instruction	EDWS-GR-OP1-W5	Drafted	0	0
167		Filteration basin	EDWS-GR-OP2	Drafted	0	0
168		Gyophyu reservoir maintenance	EDWS-GR-OP3	Drafted	0	0
169		Gyophyu pipeline maintenance	EDWS-GR-MP4	Drafted	0	0
170		Electrical & mechanical maintenance	EDWS-GR-MP5	Drafted	0	0
12	Phugyi Reservoir	Safety works in Pyawbwsu pump station	EDWS-PBPS-OP1-W1	Drafted	0	0
172		Pyawbwsu Pump Station operation	EDWS-PBPS-OP1-W2	Drafted	0	0
173		Safety works in Phugyi pump station	EDWS-PGPS-OP1-W1	Drafted	0	0
174		Phugyi Pump Station Operation	EDWS-PGPS-OP1-W2	Drafted	0	0
175		Monthly PI data	EDWS-PBPS-MP1-F1	Drafted	0	0
176		Check Sheet	EDWS-PBPS-MP1-F2	Drafted	0	0
177		Weekly Check sheet for pump station (Pyawbwsu)	EDWS-PBPS-MP1-F3	Drafted	0	0
178		Monthly Check sheet for pump station (Pyawbwsu)	EDWS-PBPS-MP1-F4	Drafted	0	0
179		Yeartk Check sheet for pump station (Pyawbwsu)	EDWS-PBPS-MP1-F5	Drafted	0	0
180		Report System	EDWS-PBPS-MP1-F6	Drafted	0	0
181			EDWS-PBPS-MP1-F7	Drafted	0	0
182		Check Sheet	EDWS-PGPS-MP1-F1	Drafted	0	0
183		Weekly Check sheet for pump station (Phugyi)	EDWS-PGPS-MP1-F2	Drafted	0	0
184		Monthly Check sheet for pump station (Phugyi)	EDWS-PGPS-MP1-F3	Drafted	0	0
185		YEarkt Check sheet for pump station (Phugyi)	EDWS-PGPS-MP1-F4	Drafted	0	0
186		Report System	EDWS-PGPS-MP1-F5	Drafted	0	0
187			EDWS-PGPS-MP1-F6	Drafted	0	0
188		Safet ywork in Phugyi pump station	EDWS-PGPS-OP1-W1	Drafted	0	0
189		Phugyi Reservoir Orginzation Chart	EDWS-PR-OP1-F1	Drafted	0	0
190		Checking Phugyi Reservoir catchment area	EDWS-PR-OP1-W1	Drafted	0	0
191		Checking Phugyi Reservoir area & Intake	EDWS-PR-OP1-W2	Drafted	0	0
192		Checking Phugyi Reservoir Surface area	EDWS-PR-OP1-W3	Drafted	0	0
13	Hlawga Reservoir	Hlawgaw Reservoir Area Inspection Activiity	EDWS-HR-OP1	Drafted	0	0
194		Hlawga Reservoir Surface water maintenance	EDWS-HR-OP2	0	0	0
195		Hlawga Reservoir Safety	EDWS-HR-OP3	0	0	0
196		Maintenance of Hlawga Reservoir	EDWS-HR-MP1	0	0	0

		197	Maintenance of Hlawga Dam	EDWS-HR-MP2		0	0
		198	Maintenance of Hlawga Pipeline	EDWS-HR-MP3		0	0
		199	Maintenance of Spillway	EDWS-HR-MP4		0	0
14	Hlawga Pump Station	200	Hlawga pump station maintenance plan	EDWS-HPS-MP		0	0
		201	Hlawga Pump Station operation plan	EDWS-HPS-OP1		0	0
		202	Hlawga Pump Station Operation Plan	EDWS-HPS-OP2		0	0
		203	Hlawga Pump Station Operation Plan	EDWS-HPS-OP3		0	0
		204	Hlawga Pump Station Report System	EDWS-HPS-RS		0	0
		205	Hlawga Pump Station Security	EDWS-HPS-SE		0	0
		206	Hlawga Pump Station Safety First	EDWS-HPS-SF		0	0
		207	Specification	EDWS-HPS-SP		0	0
		208	Operation & Maintenance of the pumps	EDWS-HPS-W		0	0
15	Nyaungnapin WTP	209	The functions of Nyaungnapin WTP	EDWS-NWTP-OP1	Completed	0	0
		210	Low Lift Pump Operation	EDWS-NWTP-OP2	Completed	0	0
		211	Low lift pump operation record	EDWS-NWTP-OP2-F1	Completed	0	0
		212	Monitoring sheet for booster pump operation	EDWS-NWTP-OP2-F2	Completed	0	0
		213	ACH Using method	EDWS-NWTP-OP3	Completed	0	0
		214	Dosing Rate Table	EDWS-NWTP-OP3-A1	Completed	0	0
		215	Dosing Rate Table	EDWS-NWTP-OP3-A2	Completed	0	0
		216	Jar Test Data	EDWS-NWTP-OP3-AP1	Completed	0	0
		217	Dosing Record	EDWS-NWTP-OP3-F1	Completed	0	0
		218	Water Quality Data	EDWS-NWTP-OP3-F2	Completed	0	0
		219	Daily ACH Dosing Record	EDWS-NWTP-OP3-F3	Completed	0	0
		220	Flocculation basin operation	EDWS-NWTP-OP4	Completed	0	0
		221	Sedimentation basin operation	EDWS-NWTP-OP5	Completed	0	0
		222	Backwashin process in Rapid Sand Filter	EDWS-NWTP-OP6	Completed	0	0
		223	Booster Pump Operation	EDWS-NWTP-OP8	Completed	0	0
		224	Monitoring sheet for booster pump operation (Phase1)	EDWS-NWTP-OP8-F1	Completed	0	0
		225	Monitoring sheet for booster pump operation (Phase2)	EDWS-NWTP-OP8-F2	Completed	0	0
		226	Things to be carried out if power failure happens	EDWS-NWTP-OP9	Completed	0	0
		227	Things to be carried out when power recovers	EDWS-NWTP-OP10	Completed	0	0
		228	Pump operation & supplied water amount record (Phase 1)	EDWS-NWTP-OP-F1	Completed	0	0
		229	Pump operation & supplied water amount record (Phase2)	EDWS-NWTP-OP-F2	Completed	0	0
		230	Production (Reservoir, WTP, underground water) & Transmission	PI Data Record	Completed	0	0
16	GIS Section	231	Duties and Responsibilities of GIS section	EDWS-GIS-OP	Completed	0	0
		232	Instructions for Data Collection	EDWS-GIS-OP-W1	Completed	0	0
		233	Table of pipe information	EDWS-GIS-OP-W1-F1	Completed	0	0
		234	Table of valve information	EDWS-GIS-OP-W1-F2	Completed	0	0
		235	Table of tubewell information	EDWS-GIS-OP-W1-F3	Completed	0	0
		236	Table of monthly consumption data	EDWS-GIS-OP-W1-F4	Completed	0	0
		237	Table of NRW information	EDWS-GIS-OP-W1-F5	Completed	0	0
		238	Table of Pumping Station Information	EDWS-GIS-OP-W1-F6	Completed	0	0
		239	Table of Water Quality data/information	EDWS-GIS-OP-W1-F7	Completed	0	0
		240	Directive on Data inputting in GIS	EDWS-GIS-OP-W2	Completed	0	0
		241	Specifications for pipeline data inputting	EDWS-GIS-OP-W2-A1a	Completed	0	0
		242	Pipe color specifications	EDWS-GIS-OP-W2-A1b	Completed	0	0
		243	Specifications for valve data inputting	EDWS-GIS-OP-W2-A2	Completed	0	0
		244	Specifications for tubewell data inputting	EDWS-GIS-OP-W2-A3	Completed	0	0
		245	Specifications for water consumption data inputting	EDWS-GIS-OP-W2-A4	Completed	0	0
		246	Specifications for tubewell data inputting	EDWS-GIS-OP-W2-A5	Completed	0	0
		247	Specifications for pumping station data inputting	EDWS-GIS-OP-W2-A6	Completed	0	0
		248	Specifications for water quality data inputting	EDWS-GIS-OP-W2-A7	Completed	0	0
		249	Directive on GIS Data analysis	EDWS-GIS-OP-W3	Completed	0	0
		250	Map of the comparison of Active and Inactive area of wards	EDWS-GIS-OP-W3-A1	Completed	0	0
		251	Map of average monthly consumption of wards	EDWS-GIS-OP-W3-A2	Completed	0	0
		252	Table of average monthly consumption data of wards	EDWS-GIS-OP-W3-F1	Completed	0	0
		253	Instructions for GIS map updating	EDWS-GIS-OP-W4	Completed	0	0
		254	Standard Mapping Format	EDWS-GIS-OP-W4-A1	Completed	0	0
		255	Survey measurement instructions	EDWS-GIS-OP-W5	Completed	0	0
17	Major Maintenance Section	256	Maintenance of Motor vehicles, generators, vehicles and mechanisms and	EDWS-HDM-MP	Drafted	0	0
		257	Maintenance of vehicles and generators	EDWS-HDM-MP-W1	Drafted	0	0
		258	Maintenance of booster pumps	EDWS-HDM-MP-W2	Drafted	0	0
		259	Maintenance of Transmission Pipes (60" and 66" Concrete Pipe)	EDWS-HDM-MP-W3	Drafted	0	0
		260	SOS Interval Chart	EDWS-HDM-MP-A1	Drafted	0	0
18	Customer Service Section	261	Directive on fulfilling the need of customer Directive on collecting water charges fully	EDWS-CSS-OP1	Completed	0	0
		262	Instruction for new customers	EDWS-CSS-OP1-W1	Completed	0	0
		263	Instruction to staff of House Connection Section	EDWS-CSS-OP1-W2	Completed	0	0
		264	Instruction for the Customer to comply with, regarding connecting to water	EDWS-CSS-OP1-W3	Completed	0	0
		265	Instruction for township staff to collect water charges for new connections	EDWS-CSS-OP1-W4	Completed	0	0
		266	Instruction for meter readers	EDWS-CSS-OP1-W5	Completed	0	0
		267	Instruction for abnormal consumption	EDWS-CSS-OP1-W6	Completed	0	0
		268	Instruction for billing of damaged meter	EDWS-CSS-OP1-W7	Completed	0	0
		269	Instruction for paying water bill	EDWS-CSS-OP1-W8	Completed	0	0
		270	Debt collection	EDWS-CSS-OP1-W9	Completed	0	0
		272	Yapha 1	EDWS-CSS-OP1-F1	Completed	0	0
		273	Yapha 2	EDWS-CSS-OP1-F2	Completed	0	0
		274	Yapha 3	EDWS-CSS-OP1-F3	Completed	0	0
		275	Yapha 4	EDWS-CSS-OP1-F4	Completed	0	0
		276	Yapha 8	EDWS-CSS-OP1-F8	Completed	0	0
19	Finance Division	277	Duties and Resopnsibilities of Finance Division	EDWS-FD-OP1	Applied	0	0
		278	Instruction for receiving water charges and other income	EDWS-FD-OP1-W1	Applied	0	0
		279	Instruction for Disbursement of expenditure, making expenditure list, and list of expense activities	EDWS-FD-OP1-W2	Applied	0	0
		280	Instruction for Fixed Assets maintenance	EDWS-FD-OP1-W3	Applied	0	0
		281	Invoice for Departmental Water charges	EDWS-FD-OP1-W1-A1	Applied	0	0
		282	YaPha 2	EDWS-FD-OP1-W1-F1	Applied	0	0
		283	YaPha 5	EDWS-FD-OP1-W1-F2	Applied	0	0
		284	YaPha 7	EDWS-FD-OP1-W1-F3	Applied	0	0
		285	YaPha 8	EDWS-FD-OP1-W1-F4	Applied	0	0
		286	HtaSa 5	EDWS-FD-OP1-W1-F5	Applied	0	0
		287	HtaSa 6	EDWS-FD-OP1-W1-F6	Applied	0	0
		288	HtaSa 7	EDWS-FD-OP1-W1-F7	Applied	0	0
		289	HtaSa 9	EDWS-FD-OP1-W1-F8	Applied	0	0
		290	HtaSa 6 B/S	EDWS-FD-OP1-W2-F1	Applied	0	0
		291	HtaSa 8	EDWS-FD-OP1-W2-F2	Applied	0	0
		292	HtaSa 9 Governmental Accounting Budget item	EDWS-FD-OP1-W2-F3	Applied	0	0
		293	Expenditure list (Expense activities)	EDWS-FD-OP1-W2-F4	Applied	0	0
		294	Expenditure list (Budget Estimation)	EDWS-FD-OP1-W2-F5	Applied	0	0
		295	Disbursement of Expenditure (Advance)	EDWS-FD-OP1-W2-F6	Applied	0	0
		296	Disbursement of Expenditure (လက်ကျန်ငွေထုတ်ပေးခြင်း)	EDWS-FD-OP1-W2-F7	Applied	0	0
		297	Stock Request Form	EDWS-FD-OP1-W2-F8	Applied	0	0
		298	Submitting Project List (Investment Form 1)	EDWS-FD-OP1-W2-F9	Applied	0	0
		299	Submitting Project List (Investment Form 2)	EDWS-FD-OP1-W2-F10	Applied	0	0
		300	Submitting Project list (Report of Progress summary)	EDWS-FD-OP1-W2-F11	Applied	0	0
		301	Submitting Project list (Report of Progress details)	EDWS-FD-OP1-W2-F12	Applied	0	0
		302	Total Fixed Asset List	EDWS-FD-OP1-W3-F1	Applied	0	0
		303	Fixed Asset Registration	EDWS-FD-OP1-W3-F2	Applied	0	0
		304	Depreciation Rate table	EDWS-FD-OP1-W3-F3	Applied	0	0
20	Main Store	305	Duties and responsibilities of Main Store	EDWS-MS-OP	Drafted	0	0

	306			EDWS-MS-OP-W1			
	307			EDWS-MS-OP-W2			
	308			EDWS-MS-OP-W3			
	309			EDWS-MS-OP-W4			
	310			EDWS-MS-OP-W5			
	311			EDWS-MS-OP-F1			
	312			EDWS-MS-OP-F2			
	313			EDWS-MS-OP-F2			
21	314	Planning Section	PI Data Monitoring and Analysis	EDWS-PS-OP	Completed	0	0
	315		Sub-Format Data request to Township (Data Collection)	EDWS-PS-OP-W1	Completed	0	0
	316		Combination of Township Data	EDWS-PS-OP-W2	Completed	0	0
	317		PI Datasheet Inputting	EDWS-PS-OP-W3	Completed	0	0
	318			EDWS-PS-OP-W4	Completed	0	0
	319		Clear Sub-format	EDWS-PS-OP-W1-F1	Completed	0	0
	320		Distribution & NRW Township Data Format	EDWS-PS-OP-W1-F2	Completed	0	0
	321		Monthly Data of Connection and Consumption Unit	EDWS-PS-OP-W1-F3	Completed	0	0
	322		Combination	EDWS-PS-OP-W2-F1	Completed	0	0
	323		Combination of NRW KPI	EDWS-PS-OP-W2-F2	Completed	0	0
	324		Connection and Consumption Data Sheet	EDWS-PS-OP-W2-F3	Completed	0	0
	325		Transmission Flow Measurement	EDWS-PS-OP-W3-F1	Completed	0	0
	326		Inputting Combination Data in PI Datasheet/Water Quality Summary	EDWS-PS-OP-W3-F2	Completed	0	0
	327		PI of Finance	EDWS-PS-OP-W3-F3	Completed	0	0
	328		PI of Admin and HR	EDWS-PS-OP-W3-F4	Completed	0	0
	329		Sales & Collection	EDWS-PS-OP-W4-F1	Completed	0	0
	330		Distribution and NRW PI Data Sheet	EDWS-PS-OP-W4-F2	Completed	0	0
	331		Distribution and NRW data request to Township	EDWS-PS-OP2	Completed	0	0
	332		Meter Connection & Consumption Data request to Township	EDWS-PS-OP3	Completed	0	0
	333			EDWS-PS-OP3-F1	Completed	0	0
	334			EDWS-PS-OP3-F2	Completed	0	0
22	335	Admin Section	Duties and Responsibilities of Admin Division	EDWS-ADM-OP	Completed	0	0
	336			EDWS-ADM-OP-W1	Completed	0	0
	337			EDWS-ADM-OP-W2	Completed	0	0
23	338	Districts & Townships	Instruction for Township works	EDWS-D&TS-OP	Completed	0	0
	339			EDWS-D&TS-OP1	Completed	0	0
	340			EDWS-D&TS-OP2	Completed	0	0
	341			EDWS-D&TS-OP3	Completed	0	0
	342			EDWS-D&TS-OP4	Completed	0	0
24	343	NRW Section	Plane table survey		Drafted	0	0
	344		Pipeline marking (Pavement cutting line)		Drafted	0	0
	345		How to check digging depth, width and depth		Drafted	0	0
	346		How to write construction signboard		Drafted	0	0
	347		Pipe laying work (Distribution - DIP, RRV, HDPE, Service Pipe)		Drafted	0	0
	348		Pressure test		Drafted	0	0
	349		Drilling for service connection		Drafted	0	0
	350		Backfill		Drafted	0	0
	351		Material management		Drafted	0	0
	352		Equipment management		Drafted	0	0
	353		Pipeline drawing (Offset drawing, As-Built drawing)		Drafted	0	0
	354		Pressure measurement		Drafted	0	0
	355		Flow measurement		Drafted	0	0
	356		Leakage volume measurement		Drafted	0	0
	357		Leak correlator		Drafted	0	0
	358		Leak detection		Under preparation	0	0
	359		Minimum Night Flow		Under preparation	0	0
	360		Night Step Test		Under preparation	0	0
	361		Customer Survey		Drafted	0	0
	362		DMA Management		Under preparation	0	0
	363		Main SOP		Drafted	0	0
	364		Main SOP Physical Loss		Drafted	0	0
	365		Main SOP Commercial Loss		Drafted	0	0
25	366	Aung Tagon Pumping Station	The functions of Aung Tagon Pumping Station	EDWS-APS-OP	Completed	0	0
	367		Maintenance of Pump station & water intake	EDWS-APS-MP1	Completed	0	0
	368		Daily Check Sheet of Pumping Station	EDWS-APS-MP1-F1	Completed	0	0
	369		Performance Indicator (PI Data) Form	EDWS-APS-MP1-F2	Completed	0	0
	370		Maintenance of Water Intake	EDWS-APS-MP1-W1	Completed	0	0
	371		Maintenance of Pumps	EDWS-APS-MP1-W2	Completed	0	0
	372		Operation of pump station & water intake	EDWS-APS-OP1	Completed	0	0
	373		Operation of Water Intake	EDWS-APS-OP1-W1	Completed	0	0
	374		Operation of Pumps	EDWS-APS-OP1-W2	Completed	0	0
26	375	PR Section	The functions of Public Relation Section	EDWS-PR-OP	Applied	0	0
	376		The functions of Public Relation Section	EDWS-PR-OP1-W1	Applied	0	0
	377		The functions of Public Relation Section	EDWS-PR-OP1-W2	Applied	0	0
	378		The functions of Public Relation Section	EDWS-PR-OP1-W3	Applied	0	0
	379		Phamlets	EDWS-PR-OP1	Applied	0	0
27	380	Design Section	The functions of Design Section	EDWS-DS-OP	Not finished	0	0
	381		Instruction for details pipeline drawing	EDWS-DS-OP-W1	Not finished	0	0
	382		Instruction for Design calculation	EDWS-DS-OP-W2	Not finished	0	0
	383		Instruction for Hydraulic Design calculation	EDWS-DS-OP-W3	Not finished	0	0
	384		Table for pipeline layout	EDWS-DS-OP-A1	Not finished	0	0
	385		Table for demographic per township	EDWS-DS-OP-A2	Not finished	0	0
	386		Future water coverage area for each township	EDWS-DS-OP-A3	Not finished	0	0
	387		Water Demand Calculation Flow Chart	EDWS-DS-OP-A4	Not finished	0	0
	388		Roughness Coefficient Table	EDWS-DS-OP-A5	Not finished	0	0
	389		Survey measurement record	EDWS-DS-OP-F1	Not finished	0	0
	390		Drawing Title Block Form	EDWS-DS-OP-F2	Not finished	0	0
28	391	Estimate Section	Inspection & Calculation on detail expenditure in the department	EDWS-SD-OP	Applied	0	0
	392		Instruction for primary investigation	EDWS-SD-OP-W1	Applied	0	0
	393		Instruction for calculation	EDWS-SD-OP-W2	Applied	0	0
	394		Estimated cost form for the works which are above 50 Lakhs	EDWS-SD-OP-W1-F1	Applied	0	0
	395		Estimated cost form for the works which are between 50 to 60 Lakhs	EDWS-SD-OP-W1-F2	Applied	0	0
	396		Estimated cost form for the works which are between 30 to 50 Lakhs	EDWS-SD-OP-W1-F3	Applied	0	0
	397		Estimated cost form for the works which are between 25 to 30 Lakhs	EDWS-SD-OP-W1-F4	Applied	0	0
	398		Estimated cost form for the works which are between 20 to 25 Lakhs	EDWS-SD-OP-W1-F5	Applied	0	0
	399		Estimated cost form for the works which are up to 20 Lakhs	EDWS-SD-OP-W1-F6	Applied	0	0
	400		Estimated cost form	EDWS-SD-OP-W1-F7	Applied	0	0
	401		Cover form	EDWS-SD-OP-W1-F8	Applied	0	0
	402		Details estimation form	EDWS-SD-OP-W1-F9	Applied	0	0
	403		Work Schedule	EDWS-SD-OP-W1-F10	Applied	0	0
	404		Departmental Form	EDWS-SD-OP-W1-F11	Applied	0	0
	405		Necessary items table	EDWS-SD-OP-W2-F1	Applied	0	0
	406		Estimated materials form	EDWS-SD-OP-W2-F2	Applied	0	0
	407		Labor Charges Form	EDWS-SD-OP-W2-F3	Applied	0	0
29	408	House Connection Section	Procedures for House connection permit	EDWS-HC-OP	Applied	0	0
	409		House Connection permit form	EDWS-HC-OP-A1	Applied	0	0
	410		Permit for water use	EDWS-HC-OP-A2	Applied	0	0
	411		Onground survey by the township officer	EDWS-HC-OP-A3	Applied	0	0
	412		Water Connection application form	EDWS-HC-OP-A4	Applied	0	0
	413		Procedures for House Connection permission	EDWS-HC-OP-W1	Applied	0	0

	414		Procedures for House Connection permission (Final water connection)	EDWS-HC-OP-W2	Applied	O	
	415		Procedures for House Connection permission (Old house water connection)	EDWS-HC-OP-W3	Applied	O	
	416		Procedures for House Connection permit (branch water connection)	EDWS-HC-OP-W4	Applied	O	
	417		Procedures for House Connection permit (extra water connection)	EDWS-HC-OP-W5	Applied	O	
30	418	Other reservoirs (Kandawgyi)	Maintenance of Kandawgyi & Inya Lakes	EDWS-K I-OP	Applied	O	
	419		Strengthening of the bank of the lakes and cleaning activities	EDWS-K I-OP-W1	Applied	O	
	420		Cleaning the weeds, algae and water born plants in the lakes	EDWS-K I-OP-W2	Applied	O	
	421		Cleaning the surface of the water using Skimmer	EDWS-K I-OP-W3	Applied	O	
31	422	Electrical & Mechanical Section	Digging and Maintenance of Tubewells and pumps	EDWS-EM-OP	Applied	O	
	423		Instruction for operation of Tube well section	EDWS-EM-OP-W1	Applied	O	
	424		Instruction for tube well and its related activities	EDWS-EM-OP-W2	Applied	O	
	425		Instruction for maintenance of Tube well section	EDWS-EM-MP-W1	Applied	O	
	426		Instruction for electrical section	EDWS-EM-MP-W2	Applied	O	
	427		Instruction for Mechanical Section	EDWS-EM-MP-W3	Applied	O	
	428		Instruction for safety and emergency	EDWS-EM-OP-W3	Applied	O	
	429		Pumps inspection format	EDWS-EM-MP-F1	Applied	O	
	430		Instruction for the pump operators	EDWS-EM-MP-A	Applied	O	
	32	431	Planning Section	Preparation and management of Mid-term Management Plan		Under preparation	
432			Form- Current performance and challenges				
433			Form- Questionnaire on priority policy for MTP				
434			Form- PIs target				
435			Form- Financial projection				
436			Form- Activity				
437			Form- Table of contents				
438			Form- Monitoring performance				
33	439	Lagunpin WTP			Under preparation		

Total 413 336
77%

Annex-3: Organization Management Plans

Annex-3.A: Future Image of WRAWSA

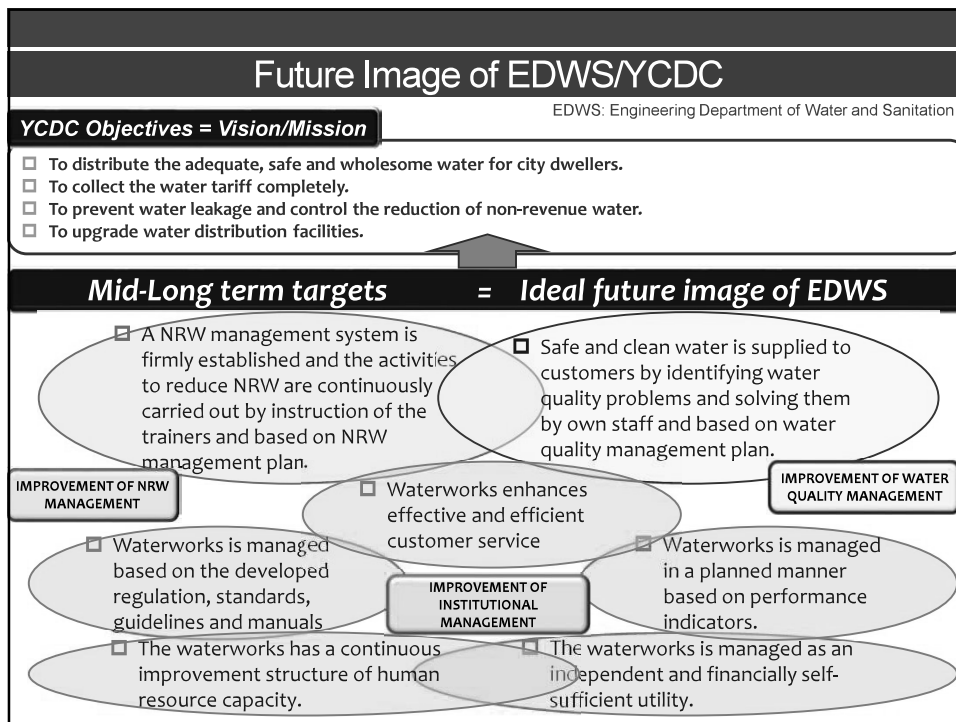
Annex-3.B: Report on Institutional Reorganization of WRAWSA

Annex-3.C: Mid-term Management Plan

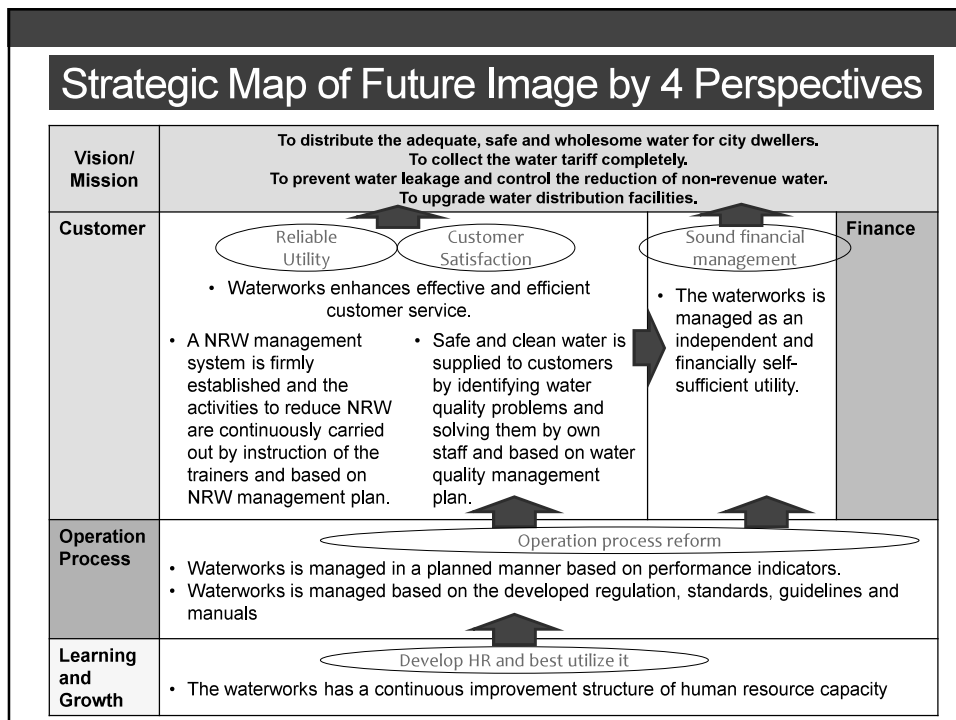
Annex-3.D: Human Resource Development Plan (Draft)

Annex-3.E: Future Vision of Customer Service Section (Draft)

Annex-3.A: Future Image of WRAWSA



1



2

Ideal future image of WSD(Mid-Long term targets)

Waterworks is managed in a planned manner based on performance indicators (PIs).

- The conditions of the waterworks is monitored and analyzed quantitatively and accurately.

Achievement state at the end of the Project (Project targets)

- ❖ PIs and their monitoring system are set up.
- ❖ Waterworks management is monitored by PIs periodically
- ❖ Planning section is established.
- ❖ Plan and condition of waterworks is shared among the staff
- ❖ Strategic planning process for waterworks is established with targets based on PIs.
- ❖ A mid- and long-term institutional plan is developed.
- ❖ Waterworks activities are done based on the plan, evaluated and improved periodically according to a PDCA (Plan-Do-Check-Action) cycle.

3

Ideal future image of WSD(Mid-Long term targets)

Waterworks is managed based on the developed regulation, standards, guidelines and manuals

- All required regulations, standards, guidelines and manuals are developed.
- A process of their preparation and enforcement is established.
- The developed standards, guideline and manuals are shared with the relevant staff.

Achievement state at the end of the Project (Project targets)

- ❖ The draft materials with high priority are developed (and enforced).
- ❖ The prepared regulations, standards, guidelines and manuals are shared by the staff.
- ❖ Daily activities of waterworks (design, construction, O&M, billing and collection, NRW management, water quality management, etc.) are carried out according to the developed regulations, standards, guidelines and manuals.

4

Ideal future image of WSD

The waterworks have a continuous improvement structure of human resource capacity

- Staff is allocated based on a human resource development plan.
- The capacity of staff is developed sustainably.
- The staff is motivated and performs with their best effort.
- The organization functions efficiently.

Achievement state at the end of the Project (Project targets)

- ❖ A human resource development plan is set and its implementation is initiated.
- ❖ Prioritized training programs are available according to level of staff.
- ❖ Training courses are conducted effectively.
- ❖ On-the-Job Training (OJT) is conducted systematically.
- ❖ Self-learning system is introduced.
- ❖ Incentive system is discussed.
- ❖ Personnel evaluation system is introduced in the Water and Sanitation Department.
- ❖ Duties and responsibilities of each sections are clear.

5

Ideal future image of WSD (Mid-Long term targets)

The waterworks is managed as an independent and financially self-sufficient utility.

- A road map to shifting to an independent and financially self-sufficient utility is prepared.
- Water tariff rates are set at full cost principle (total revenues = total costs) and cost of service principle (each unit price = each unit costs).
- The waterworks introduce P/L (profit and loss) account and B/S (balance sheet) account.
- The system of water billing, collection and customer services is efficient and effective enough comparing with waterworks in surrounding countries based on ICT (information and communication technology).

Achievement state at the end of the Project (Project targets)

- ❖ **Independent and financially self-sufficient utility**
 - Water utilities' management concept and principle are understood and other water utilities' management style is learned.
 - What YCDC should do in utilities' management is understood by top management.
 - An appropriate budget and financial plan is developed and improvement of business is initiated.
 - The utilities management and plan is shared with the staff.

6

The waterworks is managed as an independent and financially self-sufficient utility.

❖ **Water tariff rates**

- Water utilities' financial management theory is understood.
- What YCDC should do in financial management is understood.
- These are shared with the staff through training course.

❖ **P/L and B/S account**

- Water utilities' account system is learned.
- The financial conditions are understood.
- What YCDC should do in account system is understood.
- These are shared with the staff through training courses.
- Preparation of assets account (assets ledger) for B/S starts

New Activities

❖ **Establish efficient and effective billing and collection system**

- Commercial Division is established.
- The improvement of billing and collection system is carried out in a pilot T/S.
- An expansion plan of the pilot project to 31 townships is prepared.
- The expansion plan is implemented through IT training to staff members of 31 T/Ss

7

The waterworks enhance effective and efficient customer service

- Efficient and equitable customer service is promoted.
- Customer's satisfaction concerned with water use is improved.
- Overall interaction with customer is enhanced.

Achievement state at the end of the Project (Project targets)

- ❖ A firm organization of "Customer Service Division" is developed.
- ❖ Manual/guideline for billing and collection work is prepared.
- ❖ Manual works in township are changed to computer (PC) works.
- ❖ The e-Government system is promoted.
- ❖ PR activities by EDWS is enhanced.
- ❖ A complain management system in EDWS is improved.

8

Ideal future image of WSD(Mid-Long term targets)

A NRW management system is firmly established and the activities to reduce NRW are continuously carried out by instruction of the trainers and based on NRW management plan.

- NRW management section is established.
- NRW management trainers are developed and training to the relevant staff is carried out by the trainer.
- A NRW management plan is prepared with appropriate staffing and budget.
- NRW management measures are implemented in T/S according to the plan prepared.

Achievement state at the end of the Project (Project targets)

- ❖ **Establish NRW Management Section**
 - NRW management section is established with appropriate staffing and budget and it is functioned.
 - NRW management activities are carried out according to the plan prepared.
- ❖ **Collect and compile information on NRW**
 - NRW related data is collected from relevant sections/divisions and through survey, and PIs such as NRW ratio are analyzed and monitored periodically.
 - GIS pipe data ledger is prepared and used for NRW management and other sections.

9

Ideal future image of WSD(Mid-Long term targets)

A NRW management system is firmly established and the activities to reduce NRW are continuously carried out by instruction of the trainers and based on NRW management plan.

Achievement state at the end of the Project (Project targets)

- ❖ **Develop a model on the management of physical loss (leakage, over flow) and human resources**
 - A sustainable management model of physical loss is developed based on the results of a pilot project in Yankin.
 - Training on physical loss is carried out by trainers developed in pilot project.
 - Physical loss management measures including following activities are initiated based on the prepared NRW management plan.
 - Transmission flow measured by flow meters is periodically monitored and DMA flow is measured for analysis of NRW related PIs.
 - Leakage survey in DMA is carried out based on the NRW management plan.
 - Leakage is repaired and simultaneously data of location and volume of leakage is collected to understand the water balance.
 - Required leakage survey equipment is procured and used.
 - Training courses of detection and repair technologies and skills are developed and implemented by trainers.

10

Ideal future image of WSD(Mid-Long term targets)

A NRW management system is firmly established and the activities to reduce NRW are continuously carried out by instruction of the trainers and based on NRW management plan.

Achievement state at the end of the Project (Project targets)

- ❖ **Develop a model on the management of commercial loss (meter fault, miss reading of meter, illegal connection) and human resources development**
 - A sustainable management model of non-physical loss is developed based on the results of a pilot project in Yankin.
 - Training on non-physical (commercial) loss is carried out by trainers developed in pilot project.
 - Non-physical loss management measures including following activities are initiated based on the prepared NRW management plan.
 - Monitoring of customer meters is strengthened.
 - ✓ Monitoring and checking system of customer meter reading is established and implemented based on reading data collected in each T/S.
 - ✓ Status of meter is checked by meter readers and data is recorded.
 - Management of customers such as relocated households is strengthened based on monitoring system established in T/S.
 - Analysis and estimation of non-physical loss and NRW ratio are carried out based on collection data of water charges and consumed water volume.

11

Ideal future image of WSD(Mid-Long term targets)

A NRW management system is firmly established and the activities to reduce NRW are continuously carried out by instruction of the trainers and based on NRW management plan.

- Meter reading and bill collection system is standardized through T/S.
- Verification system of customer meter is established.
 - Verification equipment is developed.
 - Newly introduced meter and existing customer meters are verified.
 - Regulations of customer meter (life time, owner, replacement cost responsibility, etc.) are prepared.
- ❖ **Develop training yards for NRW reduction**
 - Training yards of NRW management is established.
 - Trainers are developed and training by trainers is carried out.
- ❖ **Develop and support implementation of the NRW management plans**
 - Annual training plan is prepared.
 - Trainers are developed and training is carried out periodically.

12

Ideal future image of WSD(Mid-Long term targets)

Safe and clean water is supplied to customers by identifying water quality problems and solving them by own staff and based on water quality management plan.

- Water Treatment Section is established and knowledge of treatment technologies is accumulated in this section, which deals with all water treatment issues working together with Water Quality Monitoring Section.
- Water quality problems are identified and solved by their own staff.
- A water quality management plan for improvement of water treatment and monitoring of water quality is prepared with adequate staffing and appropriate budget.
- Safe and clean water is supplied from the water treatment plants and the reservoirs.
- The capacity of the WTP staff on O&M of WTP and chlorination is enhanced.
- The capacity of the laboratory staff on water quality monitoring is enhanced.

13

Ideal future image of WSD(Mid-Long term targets)

Safe and clean water is supplied to customers by identifying water quality problems and solving them by own staff and based on water quality management plan.

Achievement state at the end of the Project (Project targets)

(1) Capacity on water treatment is enhanced through improvement of water treatment process.

- ❖ **Treated water quality in Nyaunghnapin WTP is improved.**
 - All problems and corresponding countermeasures are identified.
 - Water quality is monitored in WTP process by laboratory equipment and test equipment for evaluation of function of WTP such as flow meter, sieve test equipment etc.
 - Most problems on WTP operation including O&M of sand filtration facility, which is improved through model sand filter approach, are solved .
 - Standard operation procedures (SOPs) of WTP O&M in each operation process and equipment are established.
 - Facilities and equipment are well maintained according to the annual maintenance plan.
 - Water quality in each treatment process is monitored regularly based on SOPs.

14

Ideal future image of WSD(Mid-Long term targets)

Safe and clean water is supplied to customers by identifying water quality problems and solving them by own staff and based on water quality management plan.

- ❖ **Adequate chlorination is adopted in the chlorination facility in Yegu PS.**
 - Chlorination technologies are understood.
 - Adequate O&M of chlorination can be practiced.
- ❖ **Water quality improvement measures of raw water supply from reservoirs are initiated.**
 - Water quality (esp. SS) in Hlawga, Phugyi and Gyobyu reservoirs is monitored and understood.
 - Water quality improvement measures are identified and their implementation is initiated by YCDC.
- ❖ **Water Treatment Section is established with following capacity development.**
 - Water Treatment Section is established and leadership capacity of YCDC HQ on water treatment improvement is enhanced.
 - Management and technical capacity of water treatment plant is enhanced by adequate staffing and training.
 - Capacity of WTP worker is enhanced by OJT.
 - Water treatment improvement plan in the water quality management plan is prepared.

15

Ideal future image of WSD(Mid-Long term targets)

Safe and clean water is supplied to customers by identifying water quality problems and solving them by own staff and based on water quality management plan.

Achievement state at the end of the Project (Project targets)

- (2) Capacity on water quality monitoring is enhanced.**
- ❖ **Capacity of central laboratory in YCDC on water quality monitoring is enhanced.**
 - Analytical method is improved; including precision of analysis, accuracy management, and data processing.
 - The Standard Methods for water quality analysis is introduced.
 - All priority parameters are analyzed.
 - A comprehensive water quality monitoring system including site laboratories is established and implemented.
 - A water quality monitoring plan (sampling points, parameters, frequency) in the water quality management plan is prepared.
 - Cooperative work system with the newly established Water Treatment Section is established.

16

Ideal future image of WSD(Mid-Long term targets)

Safe and clean water is supplied to customers by identifying water quality problems and solving them by own staff and based on water quality management plan.

❖ Capacity of the site laboratories on water quality monitoring is developed.

- Site laboratories as follows are established with water quality monitoring plan
 - Gyobyu, Phugyi and, Hlawga reservoirs
 - Nyaunghnapin and Lagumpyin WTPs and Yegu PS
- Training for water quality analysis to site laboratories is made by the central laboratory.
- Monitoring is carried out and water quality issues are identified.

❖ Capacity to implement a water quality management plan is developed.

- Periodical water quality monitoring is implemented and water quality issues are comprehended.
- The water quality improvement measures are discussed with Water Treatment Section.
- Water quality management plan is prepared and prioritized projects are implemented.

Annex-3.B: Report on Institutional Reorganization of WRAWSA

**THE REPUBLIC OF THE UNION OF MYANMAR
YANGON CITY DEVELOPMENT COMMITTEE (YCDC)**

**PROJECT FOR IMPROVEMENT
OF
WATER SUPPLY MANAGEMENT OF YCDC**

**REPORT ON
INSTITUTIONAL REORGANIZATION
OF
ENGINEERING DEPARTMENT (WATER
AND SANITATION)(WSD) OF YCDC**

JULY 2016

**YCDC COUNTERPART TEAM
JICA EXPERT TEAM**

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CHAPTER 1. Overall Organization Structure

1.1 Overall Structure of Institutional Reorganization

During the baseline survey, the JICA expert team found the Water and Sanitation Department (WSD) lacks essential sections/divisions to fulfil the mission of waterworks. If an organization structure is not adequate, functions of waterworks are not sufficiently served.

Based on the results of the baseline survey, additionally required divisions and sections includes NRW Management, Planning, Customer Service, Water Treatment, Transmission and Distribution Management for water supply.

The JICA expert team had a series of discussion on institutional reorganization with WSD, a proposal for new organization structure was proposed and presented by the YCDC Counterparts in the 1st Joint Coordinating Committee (JCC) meeting dated on 29 January 2016.

The next table shows a summary of overall institutional change of WSD organization. Out of these changes, the detail proposal of new organizations marked as “O” is given to the respective chapter in this report. The new organization structure of institutional reorganization is shown in the following Figure.

(1) Water Supply

New Division and Section	Contents of change	Proposal in this report
1. Water Resource Division 1.1 Reservoir Sec. 1.2 Transmission and PS Sec. 1.3 Water Treatment Sec. 1.4 Water Treatment Plant Sec.	Rename - Reorganization - Reorganization - New establishment - Rename	O (Ch.7)
2. Supporting Division 2.1 Design and Drawing Sec. 2.2 GIS Sec. 2.3 Water Resource Conservation and Water Quality and Monitoring Sec. 2.4 Water Resource Sec. 2.5 Project Sec.	Existing - Rename - New establishment - New establishment and integration - New establishment - Reorganization	O (Ch.6)
3. Electrical and Mechanical Division 3.1 Major Maintenance Sec.	Existing - Reorganization	

New Division and Section	Contents of change	Proposal in this report
3.2 T/S Maintenance Sec.	- Reorganization	
4. Water Supply Division	Existing	
4.1 NRW Management Sec.	- New establishment	O (Ch.5)
4.2 Transmission and Distribution Management Sec.	- New establishment	O (Ch.8)
4.3 Transmission Pipe Sec.	- Reorganization	
4.4 District Sec.	- Reorganization	
5. Planning Sec.	New establishment	O (Ch.3)
6. Human Resource Development Sec.	Reorganization	O (Ch.4)
7. Customer Service Division	New establishment, Reorganization	O (Ch.2)
7.1 Customer Service Sec.	New establishment	
7.2 Billing and Collection Sec.	Reorganization	
7.3 T/S Support Sec.	New establishment	

(2) Wastewater

New Division and Section	Contents of change	Proposal in this report
8. Deputy Head of Department	New establishment - To manage the Division of Sanitation, Electrical and mechanical, Wastewater treatment plant	
9. Sanitation Division	Existing	
9.1 Sanitation 4 (North District)	- New establishment	
9.2 Sewer Main Sec	- Reorganization	
9.3 Branch Main Sec.	- Reorganization	
10. Electrical and Mechanical Division	Reorganization	
10.1 Electrical Sec.	- Reorganization	
10.2 Mechanical Sec.	- Reorganization	
11. Wastewater Treatment Division	Reorganization	

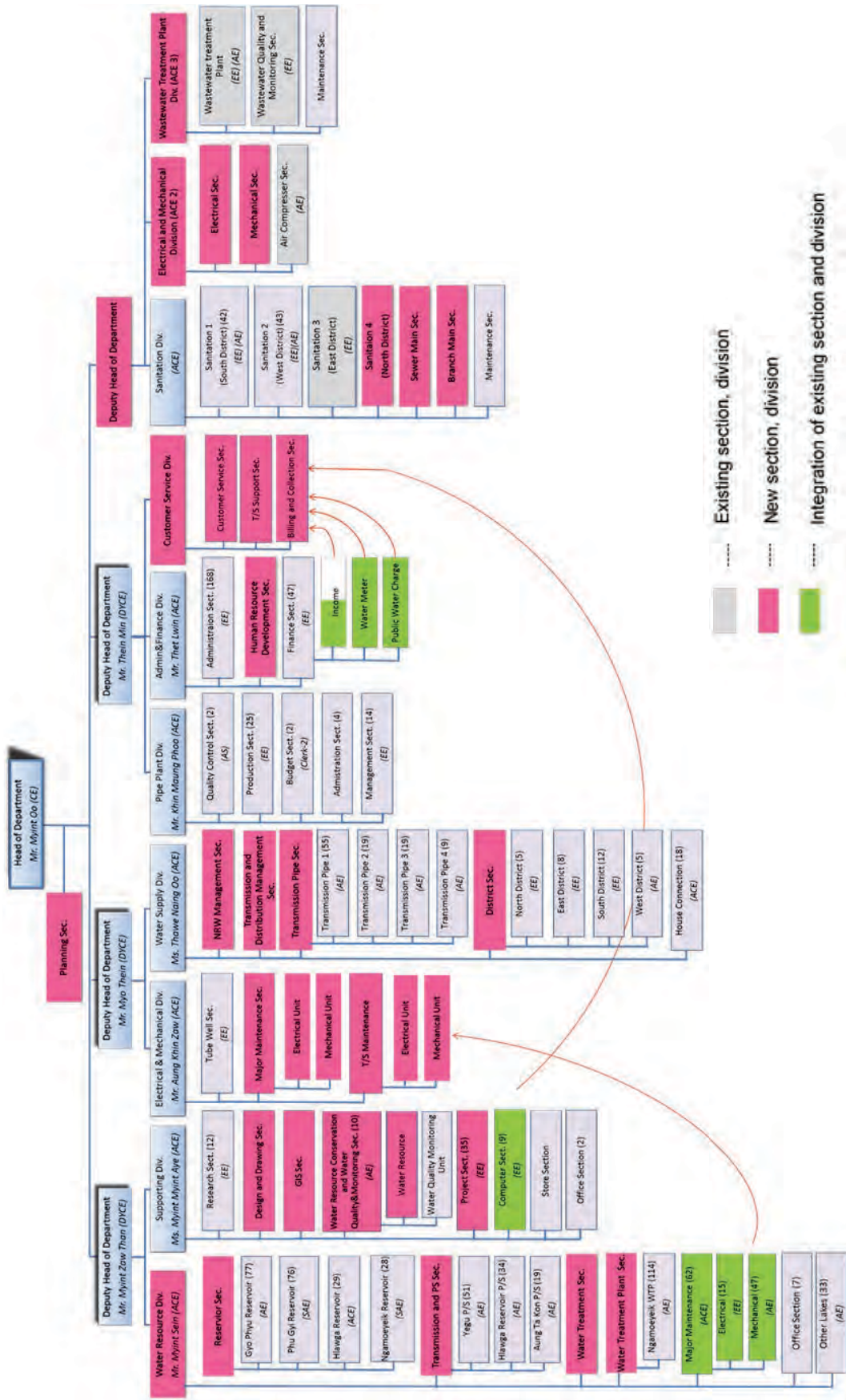


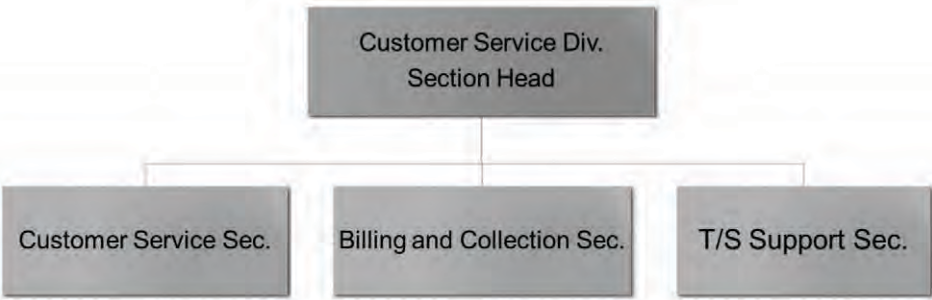
Figure 1.1 New Organizational Structure of WSD (proposed by YCDC Counterparts and JICA Expert team in the 1st JCC on 29th January, 2016)

1.2 Background

Customer Service Division dealing with their customers deems essential as waterworks to respond to complaints, maintain customer database, and conduct and improve tariff billing and collection system for provision of better service to the customers.

1.3 Proposed Organization

The proposed organization of Customer Service Division is shown in the following figure.



Staffing (proposal)

	Head	Cus. Service Sec.	Billing & Collection Sec.	T/S Support Sec.
Beginning	1	3	9	4
FY2019/2020	1	5	16	8

Figure 1.2 Customer Service Division (proposal)

1.4 Roles and Duties

The role and duties of Customer Service Division are summarized in the following table.

Sec.	Duties
Division head (1)	<ul style="list-style-type: none"> ◆ Overall management of each section's works
Customer Service Sec. (5)	<ul style="list-style-type: none"> ◆ Overall management of customer service works ◆ Overall management of customer complaint's handling ◆ Planning, research, coordination regarding improvement of customer satisfaction ◆ Public relation and information disclosure on water supply, sewerage and sanitation
Billing and Collection Sec. (16)	<ul style="list-style-type: none"> ◆ Data input of customer's meter unit/ collection amount in the billing system ◆ Information arrangement of daily revenue ◆ Printing and issuing of water bill ◆ Statistic management on billing and collection, printing of statistic information ◆ Operation management, planning and coordination of billing system ◆ Management of planning works on tariff and collection ◆ Confirmation and analysis on status of account receivable and water consumption ◆ Coordination and promotion of E-government system
T/S Support Sec. (8)	<ul style="list-style-type: none"> ◆ Guidance for improvement and supervising on billing and collection works, customer complaints management works at T/S ◆ Enhancement of equalization of billing and collection works at T/S

* The number of () is the expected staffing numbers.

CHAPTER 2. Planning Section

2.1 Background

The specialized section for planning is necessary to formulate a comprehensive management planning, development of operation and monitoring of WSD in YCDC. It is essential to identify current performance exactly and shows an appropriate utility’s direction in the succeeding period.

2.2 Proposed Organization

The proposed organization of Planning Section is shown in the following figure.

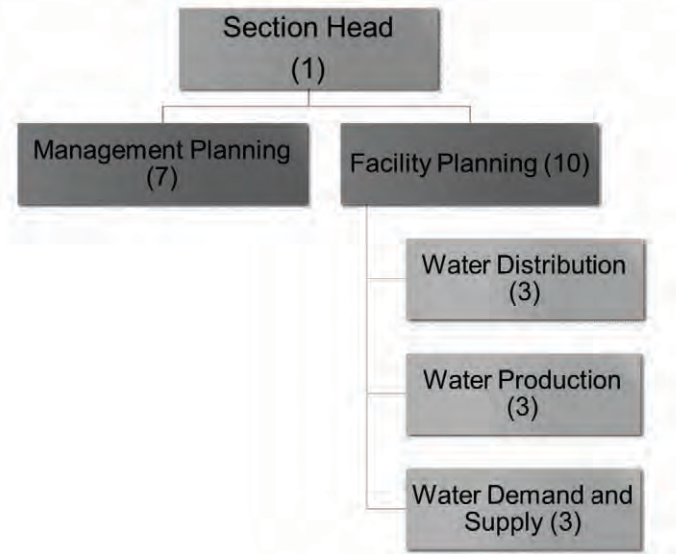


Figure 2.1 Planning Section (proposal)

2.3 Roles and Duties

The role and duties of Planning Section are summarized in the following table.

Unit	Duties	
Management Planning (7)	<ul style="list-style-type: none"> ◆ Planning of overall management plan (non-technical) of waterworks ◆ Identifying problematic areas in the operations ◆ Study, analysis and data collection on management plan ◆ Overall coordination with other sections and units ◆ Continuous assessment of the management plans and playing a leading role in strengthening/ developing improvement programs ◆ Developing and implementing performance bench marking systems comparable to good international standards. ◆ Preparing Admin. & Financial guidelines ◆ Preparing non- technical database system ◆ Monitoring performance indicators (PI) 	
Facility Planning (9)	Water Demand and Supply (2)	<ul style="list-style-type: none"> ◆ Planning of water supply and demand plan ◆ Planning of reservoir, intake, conveyance, production, transmission development
	Water Production (3)	<ul style="list-style-type: none"> ◆ Planning of distribution facilities development
	Water Distribution (3)	<ul style="list-style-type: none"> ◆ Overall coordination with other sections and units ◆ Evaluation of technologies to be adopted ◆ Evaluation of materials (pipe, accessories, etc) and water supply technologies ◆ Preparation of technical guidelines and standards ◆ Study and research on water supply technologies ◆ Safety measure of construction ◆ IT for technical database system

* The number of () is the expected staffing numbers.

CHAPTER 3. Human Resource Development (HRD) Section

3.1 Proposed Organization

The proposed organization of HRD Section is shown in the following figure.

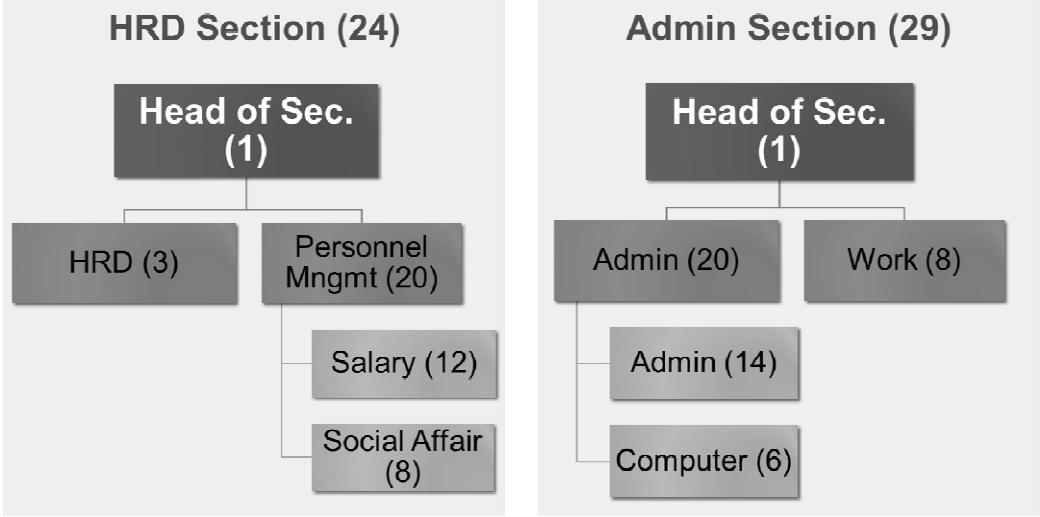


Figure 3.1 HRD Section (proposal)

3.2 Roles and Duties

The role and duties of HRD Section are summarized in the following table.

Unit	Sub-Unit	Duties
HRD (3)	HRD (3)	<ul style="list-style-type: none"> ◆ Assess HRD needs and propose HRD measures ◆ Plan, implement, evaluate and record training affairs ◆ Enhance OJT activities ◆ Maintain organization chart/job description updated
Personnel Management (20)	Salary (12)	<ul style="list-style-type: none"> ◆ Prepare paying salary and make request to Budget Dep. ◆ Check working records of staff and reflect them to calculation of salary.
	Personnel management and Social Affair (8)	<ul style="list-style-type: none"> ◆ Announce personnel transfer/promotion ◆ Arrange recruit and retirement (including past-away) ◆ Execute punishment for staff ◆ Work for staff benefit, social welfare including accommodation.
Admin (20)	Admin (14)	<ul style="list-style-type: none"> ◆ Manage official documents ◆ Be focal point to contact with other dept./authorities ◆ Announce information, regulation within WSD ◆ Manage meeting/receptions ◆ Prepare bill for other revenues of Admin Dept. ◆ Manage stock of consumables
	Computer(6)	<ul style="list-style-type: none"> ◆ Manage documentation for all Admin division.
Work (8)		<ul style="list-style-type: none"> ◆ Conduct PR activities to citizens ◆ Manage “unexpected consumption” (temporary user) ◆ Manage bills of electricity, petrol, telephone fee of WSD ◆ Manage plumber license affairs ◆ Record precipitation and report to Mayor.

* The number of () is the expected staffing numbers.

CHAPTER 4. Non-Revenue Water Management Section

4.1 Current Situation

There is no NRW management section (unit) and no responsible person for NRW management although NRW management is one of the top priorities to implement for YCDC and many donor agencies are interested in and focused.

Without the section on NRW management, enough knowledge and experience on NRW management are not accumulated. Hence, the specialized section for NRW management is necessary to formulate a strategic plan for NRW management, the effective implementation and the monitoring.

4.2 Functions

The draft functions of NRW management unit are as follows.

- Analyze existing condition of NRW
 - Survey of NRW
 - Checking meter reading data of townships
 - Analyze NRW
 - Study of tariff collection rate of TS
- Formulate a strategic plan for NRW management and monitoring implementation of plan
- Periodical data collection and monitoring NRW and related performance indicators
- Advise and train NRW management to townships
- Flow monitoring at major points in distribution network and tale flow balance for NRW management
- Periodical leakage detection
- Leakage repair and inspection
- Recording data of O&M of pipeline for NRW
- Prepare standards and manuals for NRW management and instruct

4.3 Required staff for NRW Management Section

- NRW Management Planning
- NRW Analysis
- Flow Monitoring
- Leakage detection
- Leakage repair

Once the Section is formulated and the JICA Expert team will give more efficient and effective technology transfer to this Section.

4.4 Proposed Organization

The proposed organization of Non-Revenue Water Management Section is shown in the figure 5-1.

4.5 Roles and Duties

The outline of role and duties of Non-Revenue Water (NRW) Management Section are shown in the table 5-1 and detailed duties are shown in table 5-2.

Table 4.1 Outline of Role and Duties of Non-Revenue Water (NRW) Management Section

Unit	Duties	
NRW Planning and Monitoring (3)	<ul style="list-style-type: none"> ◆ Study and analysis of Revenue & Non-Revenue water rates ◆ Planning of specific survey and study for NRW management ◆ Formulation of NRW management plan and monitoring the progress of plan 	
Commercial loss management (4)	<ul style="list-style-type: none"> ◆ Checking and study on the causes of inaccurate monthly meter reading data and guidance for collection ◆ Study of water charge collection rate of each Township ◆ Analysis of water meter condition and reporting ◆ Quarterly Analysis of revenue water on the basis of monthly meter reading 	
Unit	Team	Duties
Physical loss (Leakage) Management (16)	Water Flow Measurement (3)	<ul style="list-style-type: none"> ◆ Water flow measurement of main distribution system ◆ Establishment of "Model district for water flow measurement"
	Leakage Detection (8)	<ul style="list-style-type: none"> ◆ Leakage patrol and detection
	Leakage Repairing (5)	<ul style="list-style-type: none"> ◆ Instruction of leakage repair and inspection on site ◆ Leakage repairing ◆ Provide materials and equipment for leakage repair

* The number of () is the expected staffing numbers.

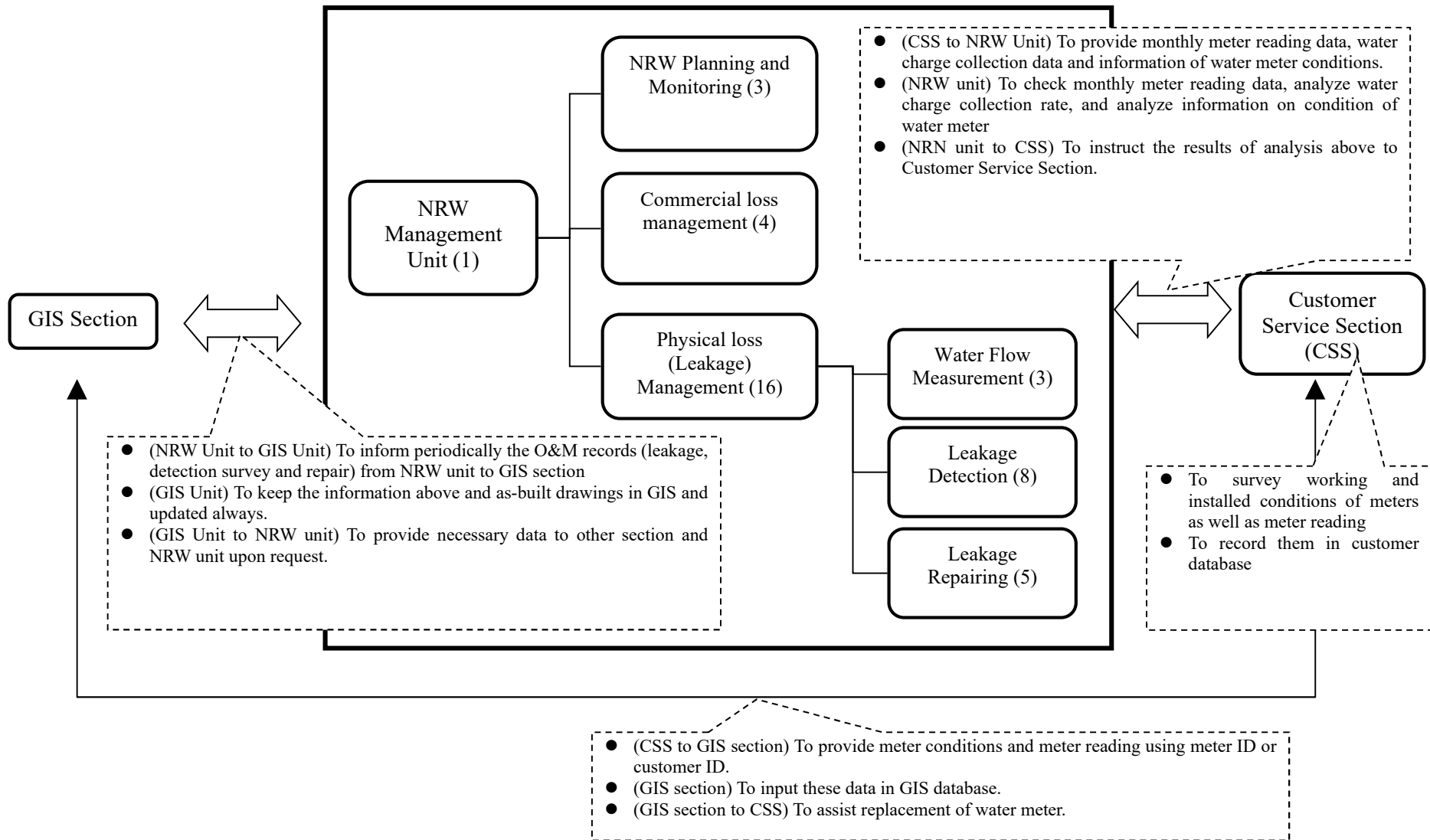


Figure 4.1 NRW Management Section (proposal)

Table 4.2 Duties of NRW Management Unit (Number of staff members)

Section	Team	Duties
NRW Planning and Monitoring (3)		<ul style="list-style-type: none"> ◆ Study and analysis of Revenue & Non-Revenue water rates <ul style="list-style-type: none"> • To study and analyze "Metered consumption", "Unmetered consumption", and "Ineffective water" etc. ◆ Planning of specific survey and study for NRW management ◆ Formulation of NRW management plan and monitoring the progress of plan <ul style="list-style-type: none"> • To formulate 5 year/10year NRW management plan and monitor the progress of plan, if required the plan should be revised.
Commercial loss management (4)		<ul style="list-style-type: none"> ◆ Checking and study on the causes of inaccurate monthly meter reading data and guidance for collection <ul style="list-style-type: none"> • To check the accuracy of the data of meter reading of each Township with Township staff, and prescript and perform corrective actions. ◆ Study of water charge collection rate of each Township <ul style="list-style-type: none"> • To check the water charge collection rate and the reason of nonpayment through the monthly meter reading data. Study and give guidance on how to collect the water charge, etc. ◆ Analysis of water meter condition and reporting ◆ Quarterly Analysis of revenue water on the basis of monthly meter reading <ul style="list-style-type: none"> • To analyze Revenue & Non-Revenue water from the data of monthly meter reading and leakage volume, and report the outcome quarterly, and provide the results to NRW Planning and Monitoring Section.
Physical loss (Leakage) Management (16)	Water Flow Measurement (3)	<ul style="list-style-type: none"> ◆ Water flow measurement of main distribution system <ul style="list-style-type: none"> • To measure water flow (by Ultrasonic flow meter) at fixed points periodically by main water distribution system in the city. • To analyze the water balance between the water supply and demand, and provide the information to "NRW Planning and Monitoring Section". ◆ Establishment of "Model district for water flow measurement" <ul style="list-style-type: none"> • To measure water flow and leakage and the change of water flow volume resulting from leakage repair etc. To collect and analyze the information above to estimate Non-Revenue water rate in other areas.
	Leakage Detection (8)	<ul style="list-style-type: none"> ◆ Leakage patrol and detection <ul style="list-style-type: none"> • To formulate an annual leakage detection plan. • To detect leakage visually in the daytime and by using detector in the nighttime.
	Leakage Repairing (5)	<ul style="list-style-type: none"> ◆ Instruction of leakage repair and inspection on site <ul style="list-style-type: none"> • To instruct township to repair the leakage detected, and inspect the repairing work according to guidelines prepared. ◆ Leakage repairing <ul style="list-style-type: none"> • To repair leakage as needed, and report the water leak volume to "NRW Planning and Monitoring Section". ◆ Provide materials and equipment for leakage repair <ul style="list-style-type: none"> • To keep the tools and equipment for leakage repair, and provide them as needed.

CHAPTER 5. GIS Section

5.1 Proposed Organization

The proposed organization of GIS Section is shown in the following figure.

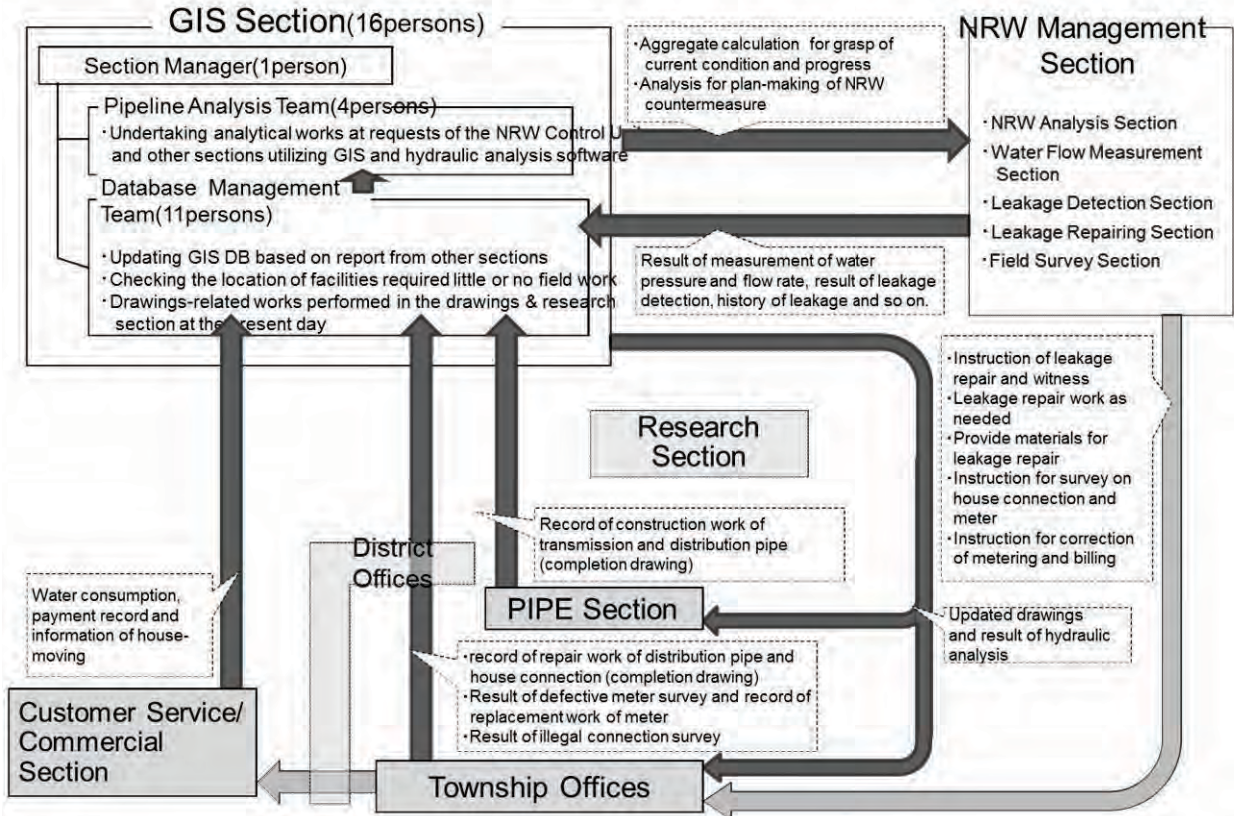


Figure 5.1 GIS Section

5.2 Roles and Duties

The role and duties of GIS Section are summarized in the following table.

Section / Team	Duties
GIS Section Manager (1)	◆ Management of the GIS Section
GIS Analysis Team (4)	◆ Undertaking calculation works and analytical works utilizing GIS
	- Consult with other sections, including NRW Control Unit, concerning methodology of calculation and analysis utilizing GIS.
	- Undertake calculation and analysis utilizing GIS at requests of other sections.
Database Management Team (11)	◆ All other atypical works in GIS Section
	◆ Migrating data to GIS from AutoCAD and other concerned drawings
	◆ Updating GIS database(DB) based on report from other sections ◆ ex. Record of construction work by the PIPE Section and the Township offices, results of water pressure measurement and leakage detection by NRW Control Unit, record of customer's water consumption by the Computer Section and so on.
	◆ Checking the location of facilities required little or no field work
Total (16)	9: at initial setting, 16: at the end of the Project.

* The number of () is the expected staffing numbers.

CHAPTER 6. Water Treatment Section

6.1 Background

Previously, there is no water treatment plant in Yangon but the first water treatment plant was constructed at Nyaunghnapin in 2005 and the second phase of Nyaunghnapin was constructed in 2013. Furthermore, Lagunbyin water treatment plant is under construction and a feasibility study on Kokkowa water treatment plant is being carried out as the first river water treatment plant. The water treatment plant is going to increase in future. However, there is no section on water treatment and enough knowledge and experience on treatment technology are not accumulated. To produce safe and clean water, acquiring and developing water treatment technology and capacity of planning, designing and operation and maintenance of treatment plant is required and water treatment engineers should be developed. For these purposes, Water Treatment Section deems essential as a focal point on water treatment technology.

6.2 Proposed Organization

The proposed organization of Water Treatment Section is shown in the following figure.

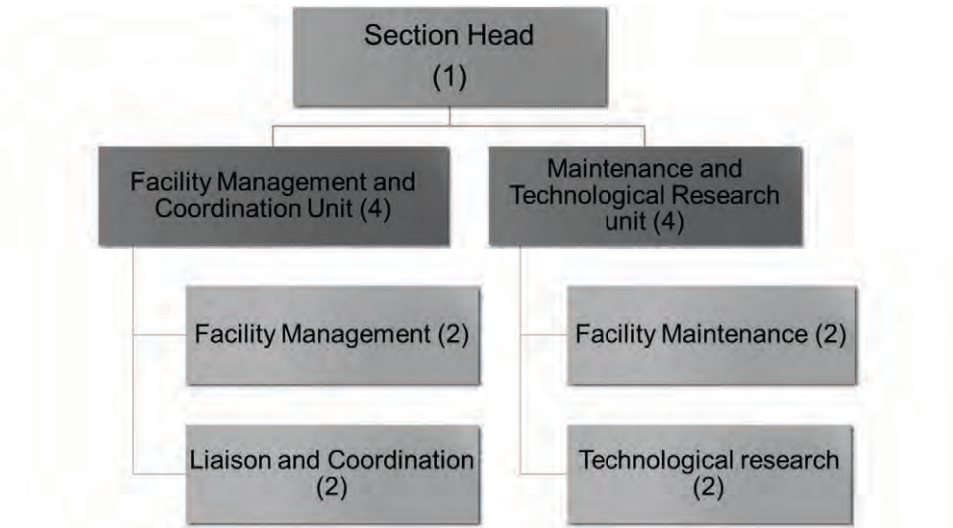


Figure 6.1 Water Treatment Section (proposal)

6.3 Roles and Duties

The role and duties of Water Treatment Section are summarized in the following table.

Unit	Sub-Unit	Duties
Facility Management and Coordination Unit (4)	Management of Facility (2)	<ul style="list-style-type: none"> ◆ Management of facilities and equipment of reservoirs, intakes, raw water transmissions, water treatment plants and clear water transmissions. ◆ Making middle term and long term facility management plan.
	Liaison and Coordination (2)	<ul style="list-style-type: none"> ◆ Liaison and coordination with relevant ministry, agency and organization about water use of reservoir and river water. ◆ Liaison and coordination with relevant ministry, agency and organization about prevention of water quality pollution of reservoir, river and open channel water. ◆ Liaison and coordination with water treatment plant and reservoir about information of WTP operation, maintenance and technical issues to be shared.
Maintenance and Technological Research unit (4)	Maintenance of Facility (2)	<ul style="list-style-type: none"> ◆ Planning and research of the maintenance of the facilities and equipment. ◆ Making middle term and long term maintenance plan. ◆ Making long term comprehensive improvement, renewal and program of the facilities and equipment. ◆ Making annual improvement and renewal program.
	Technological research (2)	<ul style="list-style-type: none"> ◆ Management, control and collection of water treatment technology and information. ◆ Providing technological information to be shared to water treatment plant and reservoir sections.

* The number of () is the expected staffing numbers.

CHAPTER 7. Transmission and Distribution Management Section

7.1 Proposed Step for Establishment

Transmission and Distribution Section will be developed at following 3 stages according to development of water transmission and distribution facilities.

7.2 Stage 1 (from August 2016)

1) Background

Currently, there is almost no flow monitoring. At this stage, a basic distribution monitoring system will be established.

2) Organization

A minimum number of staff members will be assigned in August 2016 by utilizing existing staff. It is expected as 2 civil engineers, 1 electrical engineer, and 1 mechanical engineer. These staff members shall coordinate with existing sections and units such as Reservoir Section, Transmission pump stations (Pyawbwesu, Phugyi, Yegu, Hlawga, Nyaunghnapin WTP), Service reservoirs (Kokine and Shwedagon) and Townships Offices.

3) Duty

- To set up water flow monitoring system in water sources, water treatment plants, and main transmission and distribution facilities
- To understand current water flow transmission regime
- To develop transmission and distribution flow management plan
- To achieve more efficient and effective transmission and distribution flow management in main transmission and distribution system
- To estimate overall NRW ratio
- To utilize the data in NRW management in coordination with NRW Section

4) Contents of work

- To install flow meters in transmission and main distribution system and maintenance them.
- To measure and collect water flow data at fixed points periodically and at unfixed points if required.
- To analyze the collected flow data
- To improve existing water distribution management using operation of existing pump and valve control.
- To provide the information of flow data and system improvement requirements to Planning Section.
- To prepare monthly water transmission and distribution management report

7.3 Stage 2 (From 2019)

1) Background

Establishment of district metered areas (DMA) increases according to this technical cooperation project and other projects and water distribution management will be promoted.

2) Organization

Same as the Stage 1.

3) Duty

- According to increased DMAs, data collection system will be established based on the central monitoring system using telephone communication network. Transmission and distribution data will be managed centrally in this Section.

4) Contents of work

- To install communication system to collect the data of flow meters at water distribution system.
- Same as Stage 1.

7.4 Stage 3

The construction of Lagumbyin water supply system will be completed with SCADA system and Kokkowa water supply system will start to construct. This stage will be set up after 5 years from now on in 2022.

1) Organization

- 4 civil engineers, 3 electrical engineers and 3 mechanical engineers

2) Duty

Transmission and main distribution and DMA SCADA system will be combined with Lagumbyin SCADA system. Effective and equitable distribution management will be made by combined SCADA.

3) Contents of work

- To design and set up SCADA system (installation of flow meters, pressure gauges, and motorized valves)
- To create the combined SCADA system of transmission and distribution network
- Operation and maintenance of SCADA system
- To operate the SCADA system efficiently
- To improve the distribution management

Annex-3.C: Mid-term Management Plan



Mid-term Management Plan

FY2018/19 - 2020/21



Water Supply Authority

Engineering Department(Water and Sanitation)
Yangon City Development Committee (YCDC)

This Mid-term Management Plan is prepared In cooperation with the Project for Improvement of Water Supply management of YCDC by Japan International Cooperation Agency (JICA)



Mid-term Management Plan

FY2018/19 - 2020/21

September 2018

Engineering Department
(Water and Sanitation)(EDWS)

Yangon City Development Committee (YCDC)

Message from Deputy Director General

Water is the essential need of mankind for their life and living. Usually, it can be found that the society, urban nation, Capital cities, towns and villages which can adequately access clean and hygienic water daily are significantly developing. Especially, the areas where the drinking water supply/distribution is systematically managed are more rapidly developing. As the population throughout the worldwide is speedily growing, drinking water demand is more and more increasing and fresh water shortage has been encountered. Thus, qualified water management skills become in need and systematic Plans shall be made for short and long term conservation. Long-term and Short-term Plans shall be implemented accordingly.

As Water Resource and Water Supply Authority (EDWS) of Yangon City Development Committee, all officers and staff are cooperating with JICA Technical Experts for the improvement of Water Supply Management, and this Mid-term plan is formulated under the cooperation through several internal discussions. Moreover, this has been reported to Officials of the Committee through seminars and workshops. Consequently, all officers and staff are strongly recommended to focus on promoting the Mid-term Plan to ensure the success of EDWS.



Mr. Aung San Win
Deputy Director General

Mid-term Management Plan (FY2018/19 - FY2020/21)



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1. Long-term Mission and Vision

1.1. Mission Statement and Vision Statement of Engineering Department (water & sanitation)(EDWS)

1.1.1. Mission Statement of EDWS

To provide sustainable access to drinkable water and the sanitation services to all city dwellers in Yangon city, ensuring customer satisfaction

1.1.2. Vision Statement of EDWS

To reach 100% service coverage with sustainable and affordable water and improve sanitation services for all by the end of 2040

1.2. Water Supply Master Plan and Its Targets (2025 and 2040)

The Master Plan of Water Supply System in the Greater Yangon Area was prepared in 2014 in cooperation with the JICA assistance. Mid-term Management Plan is in the line of the target of Master Plan. The outline of the master plan is shown as follows.

1.2.1. Service Level Target

Table 1 Service Level Target up to FY2040

Item	By Area	Unit	2011	Year 2018	Year 2025	Year 2040	
Service Coverage rate	Yangon City	%	37	48	58	80	
Served Population	Yangon City	Million	1.92	2.74	3.76	6.81	
Per Capita Consumption	Yangon City	Domestic	LPCD	95	117	135	178
		Non-domestic	LPCD	40% of total consumption			
Water Pressure		MPa	0.075	-	More than 0.15 Mpa		
Supply Duration		Hour	8 on average	-	24		
Water Quality Improvement		-	Not drinkable	Drinkable			

Note: The "Region" indicates the area outside of the Yangon City in the Greater Yangon Area.
Source: M/P (2014)

1.2.2. Non-Revenue Water Rate Target

The long-term target for NRW reduction was set up as 15 % in 2040. In order to achieve the long-term goal, the target levels at mostly 5 years intervals are shown below.

Table 2 NRW Rate Target up to FY2040

Items	2013	2018	2020	2025	2030	2035	2040
NRW Rate (%)	66	51	46	35	26	20	15
Leakage Rate (%)	50	37	33	25	18	13	10

Source: M/P (2014)

1.2.3. Water Demand of Yangon City

Service population was revised by the JICA Study of urban development plan in 2017 after the national census 2014. Water demand of Yangon City was re-estimated on the process of the preparation of mid-term management plan.

The revised water demand and the condition are shown as follows.

Table 3 Water Demand of Yangon City up to FY2040

Items	Year	2020	2025	2040
Population	person	5,899,269	6,638,758	8,900,378
Served Population	Person	2,702,643	3,729,899	7,023,012
Water Coverage Rate	%	46	58	82
Unit Consumption	LPCD	121	133	177
Leakage Rate	%	33	25	10
Daily Maximum Water Demand	m ³ /day	904,561	1,213,707	2,519,749
Daily Maximum Water Demand	MGD	199	267	554

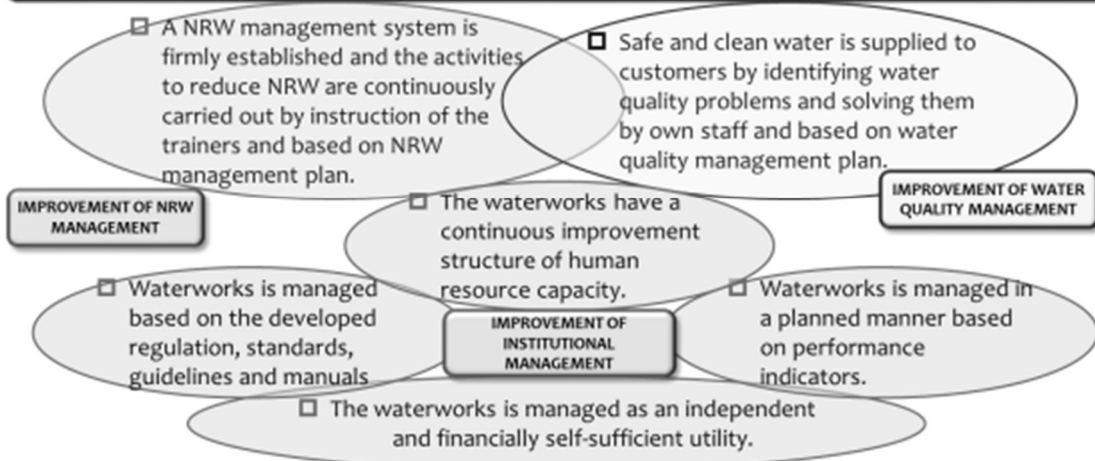
1.3. Vision of Management Capacity of EDWS

Vision of management capacity of EDWS is prepared in cooperation with the JICA Technical Assistance Project. This vision envisages the ideal future image of EDWS, especially in the six fields of water service.

YCDC Objectives = Vision/Mission

- To distribute daily clean and fresh drinking water to the people who are living in Yangon.
- To collect the water tariff fully.
- To protect the non-revenue water.
- To develop and manage the water distribution with the help of modern technology.
- Future visions

Mid-Long term targets = Ideal future image of WSD



- Waterworks is managed in a planned manner based on performance indicators (PIs)
- Waterworks is managed based on the developed regulation, standards, guidelines and manuals
- The waterworks have a continuous improvement structure of human resource capacity
- The waterworks is managed as an independent and financially self-sufficient utility
- A NRW management system is firmly established and the activities to reduce NRW are continuously carried out by instruction of the trainers and based on NRW management plan
- Safe and clean water is supplied to customers by identifying water quality problems and solving them by own staff and based on water quality management plan

2. Current Conditions

2.1. Brief History of the Utility

Yangon City Water supply system has been started since more than 150 years ago. Since 1842, It is investigated that King Tharrawady lead to instruct construction of 30 open wells in Yangon City to supply water to citizens. Pipeline water supply from Kandawgyi and Inya lakes were introduced in 1879 and 1884. The city area is wider and rapid time to time with increment of population growth, Hlawga reservoir which is the nearest one from Yangon city area was constructed in 1904 to extend. Since then, water supply amount was not adequate from this reservoir, Gyobu reservoir was extended in 1940 and Phyuugi reservoir was constructed in 1989. The water from Ngamoeyeik reservoir by using Nyaunghnapin water treatment plant was supplied additionally according to meet the increasing demand of water users in 1989 and 2005. Ngamoeyeik reservoir is the multi-purpose for irrigation, flood control and city water supply under management of Ministry of Agriculture, Livestock and Irrigation.

2.2. Governance Structure

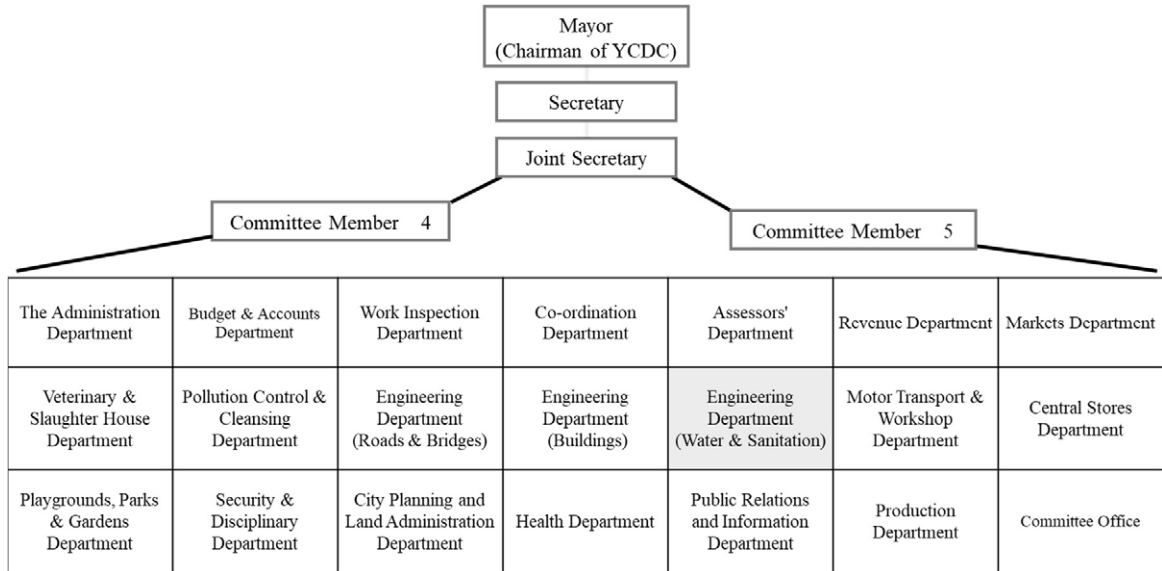
Yangon City Development Committee (YCDC) is principal agency responsible for planning, development, infrastructure provision and operation of municipal services in Yangon City. YCDC has the duties and responsibilities to lay down the policy, give guidance, supervise or implement for the development works of the City of Yangon. The operation and management of water supply and waste water is one of the main responsibilities of YCDC. Yangon City Development Committee (YCDC) has 20 departments and responsibilities for the recreation of the city dwellers, construction and maintenance of roads, bridges, building, playgrounds and parks, water supply works and disposal of solid waste, proper management of sanitation and so on. Water which is being used every day in Yangon is supplied and managed by water and sanitation department under YCDC.

There are 6 Divisions in Engineering Departments. They are-;

- 1) Reservoir Division,
- 2) Water Distribution Division,
- 3) Electrical & Mechanical Division,
- 4) Finance & Administration Division,
- 5) Sanitation Division,
- 6) Pipe Plant

Administrative support division including research section, store section, computer section, and water quality monitoring section is also organized. Total number of staff members is 2,163 as of FY 2016-2017. An organogram of YCDC and EDWS are shown as follows.

Organization Chart of Yangon City Development Committee



Mid-term Management Plan (FY2018/19-2020/21)
of Engineering Department Water and Sanitation (EDWS)

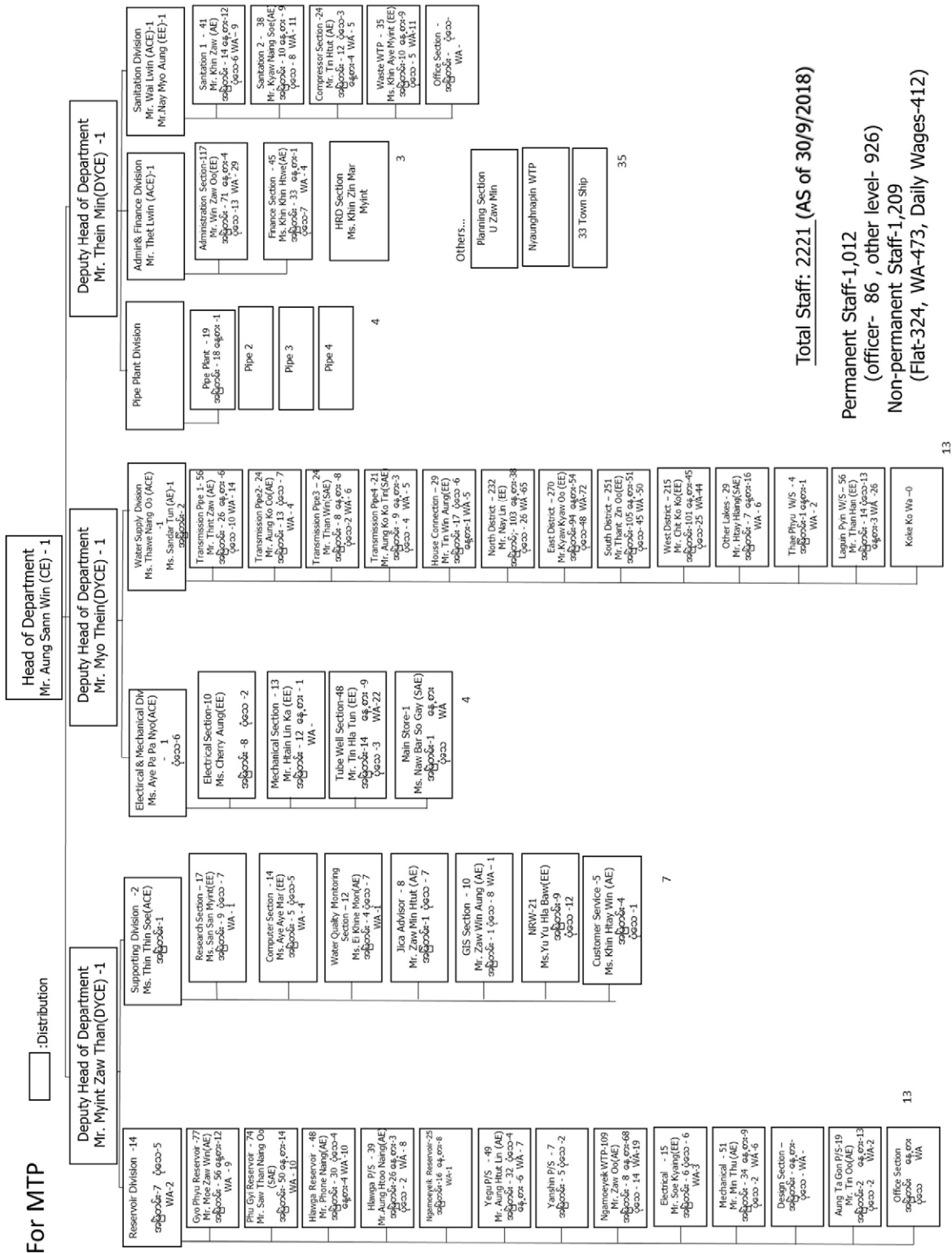


Figure 1 Organization Chart of Engineering Department (Water & Sanitation)

2.3. Key Statistical Performance Information (MKPIs and KPIs)

Performance Indicators system has been introduced in Engineering Department (water & sanitation) with cooperation of technical assistant team (JICA) since beginning period of 5 years project (2015-2020) on water supply improvement with regards to capacity building and human resources development. Performance indicators collection and data analysis for FY 2016-2017 has been done and data for FY 2017-2018 is collecting continuously.

Key performance indicators (KPIs) and management key performance indicators (MKPIs) have been set up during 5th Joint Coordinating Committee (JCC) Meeting as shown in tables. According to collected data sheets from related section, some MKPIs are described as follow:

2.3.1. Water Supply Service

(1) Service Population and Service Coverage

Percentages of population consumed water from the YCDC water supply system is 30% in YCDC area (according to FY 2016-17 sub-format data sheet, planning section). Water service coverage rate has increased slightly from 30% (domestic consumption). According to the census for the whole country Myanmar in 2014, the population of Yangon is adopted about 5.2 million. The estimated served population for drinking water is about 1.39 million at present.

(1) Total number of connections

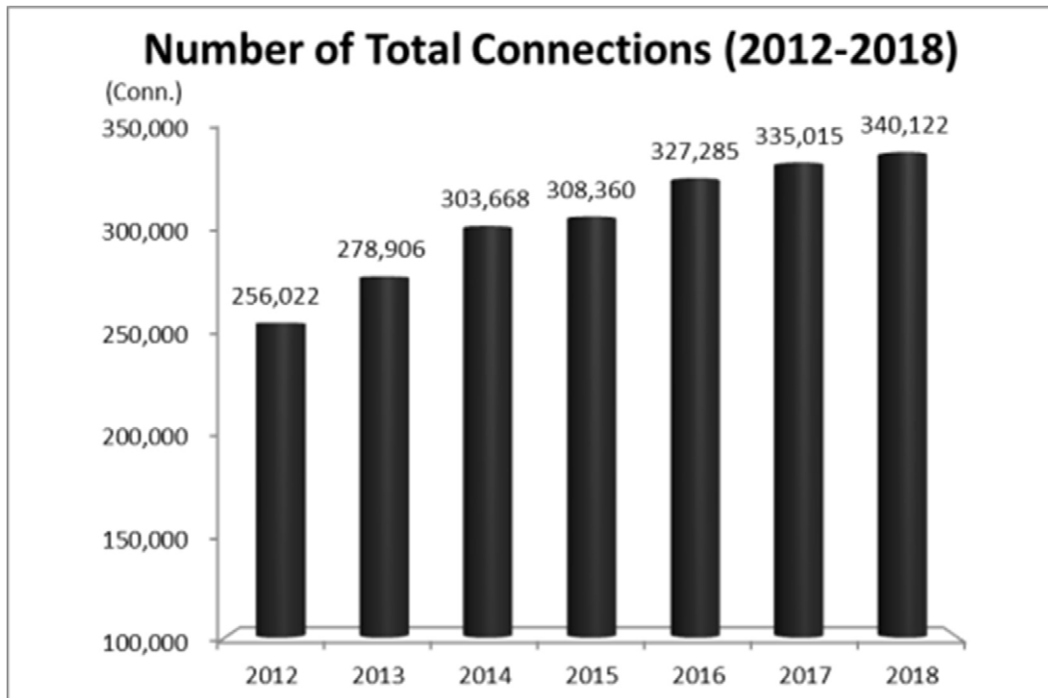
Total number of connections includes both of domestic and commercial accounts and the new connections are increasing gradually from 2012 to present. Since 2016, approximately 10,000 connections increased annually as statistic data below;

Table 4 Number of Connection by Category (FY2012-2018)

No	Year	Flat connection		Metered connection		FOC	Total connections (source; ACE office)
		Flat Bill	Flat Suspend	Metered Bill	Metered Suspend		
1	2012	55131	7557	155961	34843	2530	256,022
2	2013	54049	10402	163677	48326	2452	278,906
3	2014	54998	19893	176279	50083	2415	303,668
4	2015	49292	17277	192516	46794	2481	308,360
5	2016	55902	10578	214779	43778	2248	327,285
6	2017	45028	9315	228388	49902	2382	335,015
7	2018	48783	12828	230279	45932	2300	340,122

Source: House connection sec.

Meanwhile the amount of suspended connections in 2012FY is 42400 and the amount in 2018FY is 58760 .



Source: House connection sec.

Figure 2 Number of Total Connection (FY2012-2018)

2.3.2. Production

The accurate production volume will be obtained after installation of flow meters in the main points of the pipeline. At present, the estimated volume from PIs data sheet for FY2016/17 is 277,857,899 m³ per year.

2.3.3. Distribution and NRW

Similar to Production, the accurate NRW rate is expected to be known after installation of flow meters. The number of repaired pipe breaks per pipe length in 2016 is estimated as 0.25 numbers/ km from PI datasheets. Since the reporting system on pipe breaks is different within townships and is under improvement, this indicator value is put as tentative.

2.3.4. Water Quality

Total number of monthly samples at water facilities, tap water in township and tube well in 2016 is 724. With regard to turbidity test of treated water, the compliance ratio that meets the relevant standard is 69% in 2016.

While, the performance indicator on residual chlorine will be obtained after installation of disinfection equipment.

2.3.5. Sales & Collection

(1) Collection Efficiency

The collection ratio of the billed numbers and the billed amount for FY 2016/17 are 75% and 73% of the total respectively. For metered customers, the collection ratio of commercial customer as 78% is relatively higher than others. For flat rate customer, the collection ratio of departmental customer as 90% shows higher performance.

Table 5 Collection Ratio by Customer Category (FY2016)

Category	Collection Ratio	
	Bill connection (%)	Amount (%)
Domestic	75.5%	73.4%
Commercial	79.0%	77.9%
Department Home	70.8%	61.9%
Department Commercial	79.3%	70.4%
FE House	70.2%	71.2%
FE Commercial	71.5%	69.4%
YCDC Staff Housing	69.8%	70.6%
Domestic Flat Rate	67.0%	66.1%
Department Flat Rate	80.3%	90.0%
Total	75.4%	72.7%

Source: PIs datasheet

(2) Billing, Collection and Outstanding (bills and amount)

The collected income for FY2016/17 is accounted for 8,402 million kyat, and the outstanding amount for FY2016-17 is 3,160 million kyat.

Table 6 Billing and Collection, Outstanding (FY2016)

Demand (Bills Delivered)		Income (Bills Collected)		Balance (Outstanding)	
Bills (Nb.)	Amount (Kyat)	Bills (Nb.)	Amount (Kyat)	Bills (Nb.)	Amount (Kyat)
3,210,236	11,562,212,508	2,419,638	8,402,146,503	790,598	3,160,066,005

Source: PIs datasheet

2.3.6. Finance

(1) Operating income and expenditure

Operating income for the recent three years was mostly similar scale and stable, while operating expenditure was increased with 8.1% of the annual increase ratio. Operating income and expenditure is accounted for 11,555 million Kyats and for 18,153 million Kyats in 2016/17 respectively. Operating cost coverage ratio for FY 2016/17 is 63.7%.

Approximately 95% of the total operating income in FY2016/17 is shared by water service charge. With regard to operating expenditure, the largest amount is shared by electricity costs with 54%, followed by salary and labor charges with 20% in FY2016/17.

(2) Average revenue and operational costs per m³

Accurate average revenue per m³ and unit operational costs per m³ are not clarified due to unclarity of production volume. It is, however, estimated as 98 Kyat for average revenue per m³ sold and as 173 Kyat for unit operational cost per m³ sold respectively.

2.3.7. Administration & Human Resource

Total number of staff members in EDWS is accounted for 2,160 persons in April 2016. The total staff numbers per 1,000 connections is 6.6 persons/connections. The accumulated number of training opportunity in 2016 is 4.2 days per person. The training includes the one organized by EDWS, administration department of YCDC, foreign fund and others.

3. Performance Improvement Plan

3.1. Policy and Priority Areas of EDWS

3.1.1. Mid-term Development Policy for FY2018-2020

The following mid-term development policies were established to capture the key focus areas for the next three years. All mid-term policies are consistent with the long-term development policies, which were developed in the master plan supported by JICA.

These policies give us the overall picture of what the EDWS intends to achieve under the Mid-term Management Plan 2018-2020.

Area		Long-term Policy (M/P)		Mid-term Policy
Service Coverage	L1	Increase of the Water Service Coverage	M1	Development of Water Supply Facilities (WTP, pipeline and house connection)
	Service Level	L2	Provision of Drinkable and Safe Water	M2	Improvement of Water Quality for Drinkable Water (including Chlorination)
M3				Improvement of Water Treatment Technology
M4				Water Resource Conservation
L3		Reduction of NRW	M5	Reduction of NRW
	M6		Reduction of FOC/ illegal use	
L4	Improvement of O&M	M7	Rehabilitation/ Replacement of Distribution and Service Pipeline	
Management Level	L5	Institutional Capacity Development	M8	Enhancement of Customer Service
			M9	Enhancement of Human Resource Development
			M10	Organizational Re-arrangement
	L6	Enhancement of Regulatory Framework	M11	Development of Regulation/Standard/Guideline/Manual (RSGM)
	L7	Achievement of Cost Recovery and Financial Sustainability	M12	Promoting Preparation of Tariff Revision

Figure 3 Mid-term Development Policy

3.1.2. Strategic Objectives for Mid-term FY2018-2020

The strategic objectives which will be aligned to the mid-term policies are identified. These objectives are summarized as follows.

Mid-term Policy		Objectives
M1	Development of Water Supply Facilities (WTP, pipeline and house connection)	<ul style="list-style-type: none"> To develop water infrastructure such as new WTP and pipeline for increase of production and distribution capacity
M2	Improvement of Water Quality for Drinkable Water (including Chlorination)	<ul style="list-style-type: none"> To distribute clean, safe and drinkable to the city dwellers (by Chlorination & by Turbidity control)
M3	Improvement of Water Treatment Technology	<ul style="list-style-type: none"> To develop and enhance water treatment technologies and the capacity related to this need to enhance in the department
M4	Water Resource Conservation	<ul style="list-style-type: none"> To maintain and protect the water resource to be able for use sustainably which is fundamental for water supply work and knowledge related to water resources are to enhance
M5	Reduction of NRW	<ul style="list-style-type: none"> To reduce leakage and increase effective water quantity
M6	Reduction of FOC/ illegal use	<ul style="list-style-type: none"> To reduce waste of water
M7	Rehabilitation/ Replacement of Distribution and Service Pipeline	<ul style="list-style-type: none"> To increase the water pressure/to reduce leakage
M8	Enhancement of Customer Service	<ul style="list-style-type: none"> To develop the understanding between the customers and the department
M9	Enhancement of Human Resource Development	<ul style="list-style-type: none"> To develop the capability of staff in EDWS for successful and good performance
M10	Organizational Re-arrangement	<ul style="list-style-type: none"> To re-arrange organization and strengthen management base for efficient management process of water utility
M11	Development of Regulation/Standard/Guideline/Manual (RSGM)	<ul style="list-style-type: none"> To develop RSGM for waterworks management to ensure the quality of water service
M12	Promoting Preparation of Tariff Revision	<ul style="list-style-type: none"> To promote preparation of tariff revision including tariff for the structure and rates for the next development term 2021-25

Figure 4 Mid-term Strategic Objectives

3.1.3. Strategic Map by Balanced Score Card Approach

The mid-term development policies are categorized into 4 strategic perspectives of the BSC approach. The management of water service will be progressing with the balanced views.

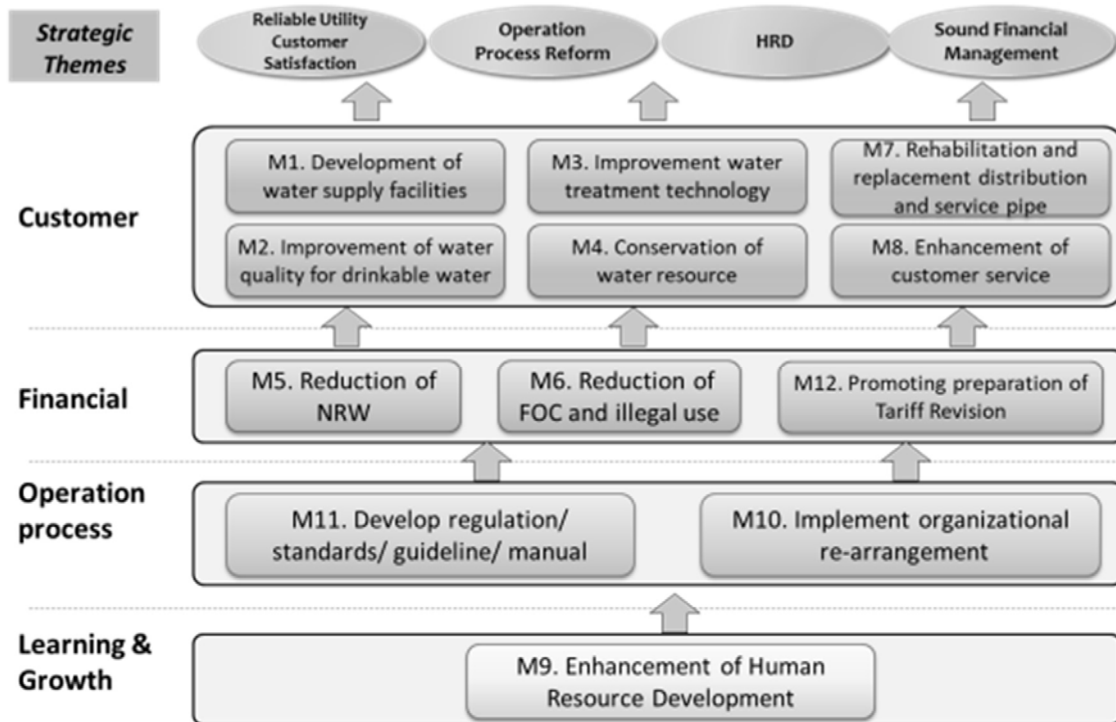


Figure 5 Strategic Framework by BSC approach

3.2. Major Challenges Facing in Implementing Mid-term Plan

Major challenges for the implementation of the Mid-term Management Plan are summarized in follows.

- **YCDC Organizational Reform:** The organizational reform of YCDC in overall has been considered by YCDC and the further top governmental level, however the detail of reform and the schedule has been not yet officially determined. Because the reform has major impact on EDWS activities during the mid-term, EDWS follows the direction and the schedule time to time.
- **Institutional Governance:** While, in order to sustain as Water Supply Authority, the present organization structure should also be revised to become an effective and efficient organizational structure with divisions clarifying clear duties and responsibilities.
- **Commitment:** EDWS acknowledge that commitment of the top management of EDWS and the leadership are significant elements of the achievement of MTP. In addition, the responsible sections of EDWS need to enhance their staff

members to be aware of the targets, the schedule and the relevant activities of MTP

- **Securing Budget:** The budget amounts for the candidate EDWS activities for FY2018/19-2020/21 which are preliminary selected during the preparation process of MTP should be secured by the region government and the union government.
- **Enhancing PDCA Cycle:** It is a trial for EDWS to formulate MTP including the mid-term targets and to improve water service toward the achievement of the targets. EDWS will monitor the progress and achievement status every year, and revise and adjust them as necessary. EDWS will manage waterworks by PDCA cycle.
- **Accurate Data Collection:** Some of KPIs and MKPIs are still tentative value/ or not identified due to the necessity of installation of equipment and of additional survey. EDWS will carry out these necessary actions on schedule and make clear the data of PIs.
- **Ensuring Water Supply from Lagunpyin WTP:** The operation of Lagunpyin WTP is a key element for this mid-term. It shall start operation on schedule to meet the increasing water demand for domestic and commercial customers. Also, an appropriate billing and collection will contribute to achieve operating costs recovery in the mid-term.

3.3. Performance Targets

3.3.1. MKPIs and KPIs

EDWS has acknowledged the importance of benchmarking and has launched monitoring water service performance by the datasheet of Performance Indicators (PIs). Out of all PIs, 59 key performance indicators (KPIs) and 15 management KPIs were identified and set up.

Information is partially not available at present due to the necessity of equipment installation and of further survey, so that EDWS strengthen PIs monitoring system and collection of accurate information by installing in this mid-term FY2018-2020.

The structure of PIs and the past performance are shown as follows.

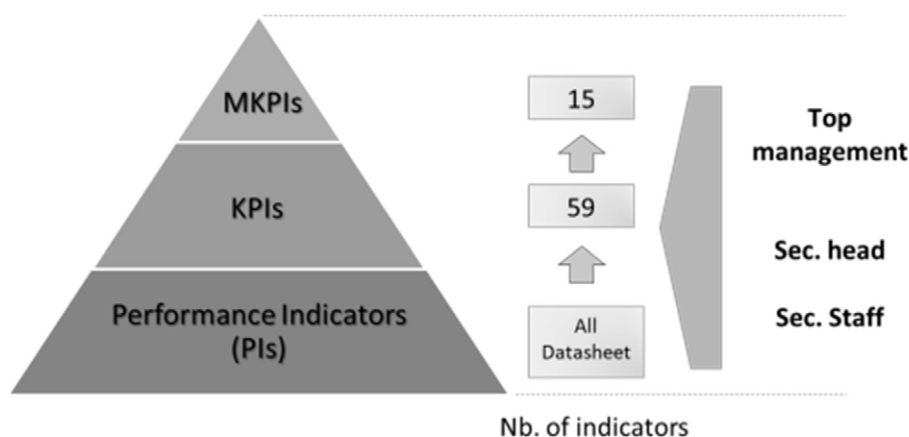


Figure 6 Structure of Pls, KPIs and MKPIs

Table 7 Management KPIs

	Sq/N	Symbol	Indicators	Unit	FY2016/17	Remarks
1. Water Supply Service	1	S1	Service population	'000 inhabitants	1,392	<ul style="list-style-type: none"> Tentative value (estimation) To be confirm after customer survey
	2	S2	Total connections	Nb.	327,285	<ul style="list-style-type: none"> Tentative value To be confirmed after summarizing Sub-format data
	3	S28	Service coverage rate	%	30.1%	<ul style="list-style-type: none"> Tentative value (estimation) To be confirmed after customer survey
2. Production & Transmission	4	PT4-4	Daily average total production	m ³ /day	761,255	<ul style="list-style-type: none"> Tentative value (estimation) To be confirmed after installation of flow meters
3. Distribution & NRW	5	D17	NRW ratio	%	—	<ul style="list-style-type: none"> To be confirmed after installation of flow meters
	6	D23	The number of repaired pipe breaks per pipe length	Repaired Nb./km/year	0.28	<ul style="list-style-type: none"> Continue to guide to record all of number of repaired points
4. Water Quality	7	Q7-1-1	Compliance ratio of monthly water test in water facilities (turbidity)	%	69.0	
	8	Q7-5-2	Compliance ratio of monthly water test at tap water in TS (Residual chlorine)	%	—	<ul style="list-style-type: none"> To be available after start disinfection by chlorination
5. Sales & Collection	9	C15-3	Operating metering ratio (by total connection)	%	—	<ul style="list-style-type: none"> To be confirmed after the site survey by T/S
	10	C20-2	Collection ratio in amount	%	72.7	
6. Finance	11	F5	Operating ratio cost (Operating coverage)	%	63.7	<ul style="list-style-type: none"> Depreciation costs are not included
	12	F9	Average revenue per m ³ sold	Kyat/m ³ water sold	98	<ul style="list-style-type: none"> Tentative value (estimation) To be more accurately confirmed after installation of flow meters Water volume sold (2017/18)

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	Sq/N	Symbol	Indicators	Unit	FY2016/17	Remarks
	13	F12	Unit operational cost for water sold	Kyat/m ³ water sold	173	<ul style="list-style-type: none"> • Tentative value (estimation) • To be more accurately confirmed after installation of flow meters • Water volume sold (2017/18) • Depreciation costs are not included
7. Administration & Human Resource	14	H8	Training period x number of trainee/Total staff	Training day/person/year	4.2	
	15	H11	Total staffs number/1000 connections	person/000 conn.	7.4	

3.3.2. Key Targets

The annual target for the period FY2018-2020 is summarized in follows.

Table 8 Key Performance Targets for FY2018/19-2020/21

Symbol	Indicators	Unit	Present	2018/19	2019/20	2020/21
PT1	Resource capacity	MGD	205	205	208	245
		m ³ /day	932,000	932,000	947,167	962,333
C19-1	Water volume sold	Mil. m ³ /year	111 (2017/18)	116	124	154
D2-7	New pipeline extension	km	-	158	109	191
	Pipe Rehabilitation/ Replacement	km	-	83	32	61
S2	No. of connection		327,285	345,232	378,149	383,259
	No. of connection (ordinary)	Nb.	(2016/17)	345,232	350,342	355,452
	No. of connection (Lagunpyin)	Nb.			27,807	27,807
Q7-1-1	Compliance ratio of monthly water test in water facilities (turbidity)	%	69 (2016/17)	74	75	76
F9	Average revenue	Kyat/m ³ water sold	98 (2016/17)	103	158	170
F12	Unit operational cost	Kyat/m ³ water sold	173 (2016/17)	192	198	181
C20-2	Collection ratio (in amount)	%	72.7 (2016/17)	75.4	76.8	78.2
F5	Operating cost coverage ratio	%	63.7 (2016/17)	53.8	79.8	94.2
H8	Training period x number of trainee/Total staff	Training day/person/year	2.44 (2016/17)	1.39	1.39	1.39

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Symbol	Indicators	Unit	Present	2018/19	2019/20	2020/21
H2	Total staff number	person	2,160 (2016/17)	2,244	2,318	2,386
H11	Total staffs number/1000 connections	person/ '000 conn.	7.4	6.0	5.7	5.4
S28	Service coverage rate	%	-	To be confirmed during this mid-term		
D17	NRW Ratio	%	-	To be confirmed during this mid-term		

[Note]

Present value --- collected date of 2016/17 or 2017/18

C19-1, F9, F12 --- Revenue water volume is tentative value

S28 --- the current % will be confirmed after a customer survey

D17 --- the current % will be confirmed after installation of flow meter and monitoring the data

EDWS will monitor progresses in implementation of the plan through an annual evaluation for the mid-term. This will forms as an input into the preparation of the next mid-term plan for FY2021/22-2025/26.

3.3.3. Outline of Performance Improvement Plan

Area of Focus	Priority Area	Objectives	Major Activities
Service Coverage	Development of Water Supply Facilities	To develop water infrastructure such as new WTP and pipeline for increase of production and distribution capacity	<ul style="list-style-type: none"> - Establishment of Lagunbyin water supply system - Establishment of Kokkowa water supply system
	Improvement of water quality or drinkable water	To distribute clean, safe and drinkable to the city dwellers (by Chlorination & by Turbidity control)	<ul style="list-style-type: none"> - Development of Chlorine facilities in Lagunbyin and Kokkowa Project - Establishment of Chlorine management system
	Improvement of Water Treatment Technology	To develop and enhance water treatment technologies and the capacity related to this need to enhance in the department	<ul style="list-style-type: none"> - Improvement of Nyaungnapin WTP treatment plan - Establishment of O&M of Nyaungnapin WTP - Development of water quality Improvement of 3 Reservoirs(Gyobyu,Phugyi<Hlawga)
Improvement of Water Quality	Water Resource Conservation	To maintain and protect the water resource to be able for use sustainably which is fundamental for water supply work and knowledge related to water resources are to enhance	<ul style="list-style-type: none"> - Strengthening of water quality monitoring
	Improvement of Service Level	Improvement of Water Supply Condition	<p>To reduce leakage and increase effective water quantity</p> <ul style="list-style-type: none"> - DMA Management in Yankin Tsp, in South Okkalarpa Tsp, in North Okkalapa Tsp, in Insein Tsp, in Mayangone Tsp - NRW Training Yard Construction and training - Procurement of NRW Tools and Equipment - Development of SOPs for NRW Management Operation & Maintenance of DMAs - Development and update of pipeline map - Collection of basic data regarding NRW management - Grasping NRW rate periodically by data collection on distribution and effective water - Pipe laying at proper location to prevent leakage - Prevent leakage at branch point - Implementation of water pressure test to prevent leakage - Efficient leak detection/repair on existing transmission/distribution pipe - Recording of every leakage repair work - Grasping situation of existing meter function - Installation of meter at proper location - Maintenance of measurement accuracy of water meter - Securing function of large size meter - Solving non-metered customer

3C - 18

Figure 7 Outline of Performance Improvement Plan (1/2)

Area of Focus	Priority Area	Objectives	Major Activities
Improvement of Service level Improvement of Water Supply Condition	Reduction of FOC/Illegal use	To reduce waste of water	- Water meter Installation/Replacement
	Rehabilitation/Replacement of Distribution and Service Pipeline	To increase the water pressure/to reduce leakage	- Replacement of concrete pipe to reduce leakage - Replacement of aged distribution pipe to reduce leakage - Installation of new distribution pipe to increase water supply pressure - Development of new well to enforcement of water supply - Replacement of distribution Pumps & Valves - Maintenance of Transmission pipes - Development of water transmission monitoring system
Management Level	Enhancement of Customer Service	To develop the understanding between the customers and the department	- Improvement of Billing & Collection System - Enhancement of Customer relation
	Enhancement of Human Resource Development	To develop the capability of staff in EDWS for successful and good performance	- Formulation of Human Resource Development Plan - Continuous implementation of Prioritized Training Courses - Promotion of OJT
	Organizational Re-arrangement	To re-arrange organization and strengthen management base for efficient management process of water utility	- Improvement of Institutional Governance - Reorganization - Establish Planning System
	Development of Regulation/Standard/Guideline/Manual	To develop RSGM for waterworks management to ensure the quality of water service	- Preparation of water supply Regulation - Development of SOPs for water quality management, NRW, Township operation, O&M of facilities
	Promoting Preparation of Tariff Revision	To promote preparation of tariff revision including tariff for the structure and rates for the next development term 2021-25	- Preparation of Accounting Policy & Accounting System - Preparation of setting to water tariff policy

Figure 8 Outline of Performance Improvement Plan (2/2)

3.3.4. Activity Responsibility Matrix

Sr. No	Major Activities	Responsibility															
		Project Sec;	Water quality Sec	Water Treatment Plant Sec;	Water Treatment Sec;	NRW Management Sec;	Reservoir Sec;	House Connection Sec;	District Off; Transmission & Distribution Management	Transmission Pipe Sec;	Design&Drawing Sec;	Tubewell Sec;	Administration Sec;	Planning Sec;	Customer Service Div;	HRD Sec;	Finance Sec;
1	Establishment of Lagunbyin water supply system	0															
2	Establishment of Kokkowa water supply system	0															
3	Development of Chlorine facilities in Lagunbyin and Kokkowa Project	0															
4	Establishment of Chlorine management system	0		0													
5	Improvement of Nyaungnapin WTP treatment plant		0	0													
6	Establishment of O&M of Nyaungnapin WTP		0	0													
7	Development of water quality Improvement of 3 Reservoirs (Gyobyu,Phugyi<Hlawga)	0		0		0											
8	Strengthening of water quality monitoring	0															
9	DMA Management in Yankin Tsp, in South Okkalarpa Tsp, in North Okkalapa Tsp, in Insein Tsp, in Mayangone Tsp					0			0			0					
10	NRW Training Yard Construction and training					0					0						
11	Procure NRW Tools and Equipment					0											

Figure 9 Activity Responsibility Matrix (1/4)

Sr. No	Major Activities	Responsibility															
		Project Sec;	Water quality Sec	Water Treatment Plant Sec;	Water Treatment Sec;	NRW Management Sec;	Reservoir Sec;	House Connection Sec;	District Off; Transmission & Distribution Management	Transmission Pipe Sec;	Design&Drawing Sec;	Tubewell Sec;	Administration Sec;	Planning Sec;	Customer Service Div;	HRD Sec;	Finance Sec;
12	Development of SOPs for NRW Management Operation & Maintenance of DMAs					0											
13	Create and update pipeline map					0					0						
14	Collect basic data regarding NRW management					0											
15	Grasp NRW rate periodically by data collecting on distribution and effective water					0			0	0							
16	Pipe laying at proper location to prevent leakage					0											
17	Prevent leakage at branch point					0											
18	Implement water pressure test to prevent leakage					0											
19	Efficient leak detection/repair on existing transmission/distribution pipe					0											
20	Record every leakage repair work					0											
21	Grasp situation of existing meter function					0			0								
22	Install meter at proper location					0			0								

Figure 10 Activity Responsibility Matrix (2/4)

*Mid-term Management Plan (FY2018/19-2020/21)
of Engineering Department Water and Sanitation (EDWS)*

Sr. No	Major Activities	Responsibility																
		Project Sec;	Water quality Sec	Water Treatment Plant Sec;	Water Treatment Sec;	NRW Management Sec;	Reservoir Sec;	House Connection Sec;	District Off;	Transmission & Distribution Management Sec;	Transmission Pipe Sec;	Design & Drawing Sec;	Tubewell Sec;	Administration Sec;	Planning Sec;	Customer Service Div;	HRD Sec;	Finance Sec;
23	Maintain measurement accuracy of water meter					O												
24	Secure function of large size meter					O												
25	Solve non-metered customer					O												
26	Water meter Installation/Replacement							O	O									
27	Replacement of concrete pipe to reduce leakage									O	O	O						
28	Replacement of aged distribution pipe to reduce leakage									O	O	O						
29	Installation of new distribution pipe to increase water supply pressure									O	O	O						
30	Development of new well to enforcement of water supply												O					
31	Replacement of distribution Pumps & Valves									O	O							
32	Maintenance of Transmission pipes									O	O							
33	Development of water transmission monitoring system									O	O							
34	Improvement of Billing & Collection System															O		O

Figure 11 Activity Responsibility Matrix (3/4)

Sr. No	Major Activities	Responsibility																
		Project Sec;	Water quality Sec	Water Treatment Plant Sec;	Water Treatment Sec;	NRW Management Sec;	Reservoir Sec;	House Connection Sec;	District Off;	Transmission & Distribution Management Sec;	Transmission Pipe Sec;	Design & Drawing Sec;	Tubewell Sec;	Administration Sec;	Planning Sec;	Customer Service Div;	HRD Sec;	Finance Sec;
35	Enhancement of Customer relation														O			
36	Formulation of Human Resource Development Plan															O		
37	Continuous implementation of Prioritized Training Courses															O		
38	Promotion of OJT															O		
39	Improvement of Institutional Governance												O					
40	Reorganization												O					
41	Establish Planning System													O				
42	Preparation of Accounting Policy & Accounting System																	O
43	Preparation of setting to water tariff policy																	O
44	Preparation of water supply Regulation													O				
45	Development of SOPs for water quality management ,NRW, Township operation and O&M of facilities	O	O	O	O				O	O				O	O			O

Figure 12 Activity Responsibility Matrix (4/4)

4. Major Activities for FY2018/19-FY2020/21

Development of Water Supply Facilities

Sr. No.	Major Activities	Description
1	Establishment of Lagunpyin Water Supply System	<ul style="list-style-type: none">• Lagunpyin WTP will commence its operation after completion of the construction• Water (40 MGD) will be supplied to Zone 7& Zone8 including four new dagon T/Ss, Tharkayta T/S, Dawpon T/S in March, 2021• Water (10 MGD) of water will be supplied to Thilawa SEZ in Nov, 2019• Loan agreement was made in 2015 and estimated to finish in July, 2022
2	Establishment of Kokkowa Water Supply System	<ul style="list-style-type: none">• To prepare the detail designs during 2018-2020, cost estimation and make tendering• To purchase and acquire the required land• To establish distribution system for zone 1• To prepare Environmental Management Plan (EMP), Environmental Monitoring Plan (EMoP), and Relocation Assistance Plan / Resettlement Action Plan (RAP)• Loan agreement was made in 2017 and estimated to finish in July, 2026



Water Resource Capacity

Source	Unit	2018/19	2019/20	2020/21	Water source
Total	MGD	205	208	245	
Tube wells	MGD	20	20	20	Groundwater
Gyobyu	MGD	27	27	27	Reservoir
Phugyi	MGD	54	54	54	Reservoir
Hlawga	MGD	14	14	14	Reservoir
Ngamoeyeik Phase1	MGD	45	45	45	Reservoir
Ngamoeyeik Phase2	MGD	45	45	45	Reservoir
Lagunpyin (Thilawa SEZ)	MGD		3	7	Reservoir
Lagunpyin (Zone 7, Zone8)	MGD			30	Reservoir

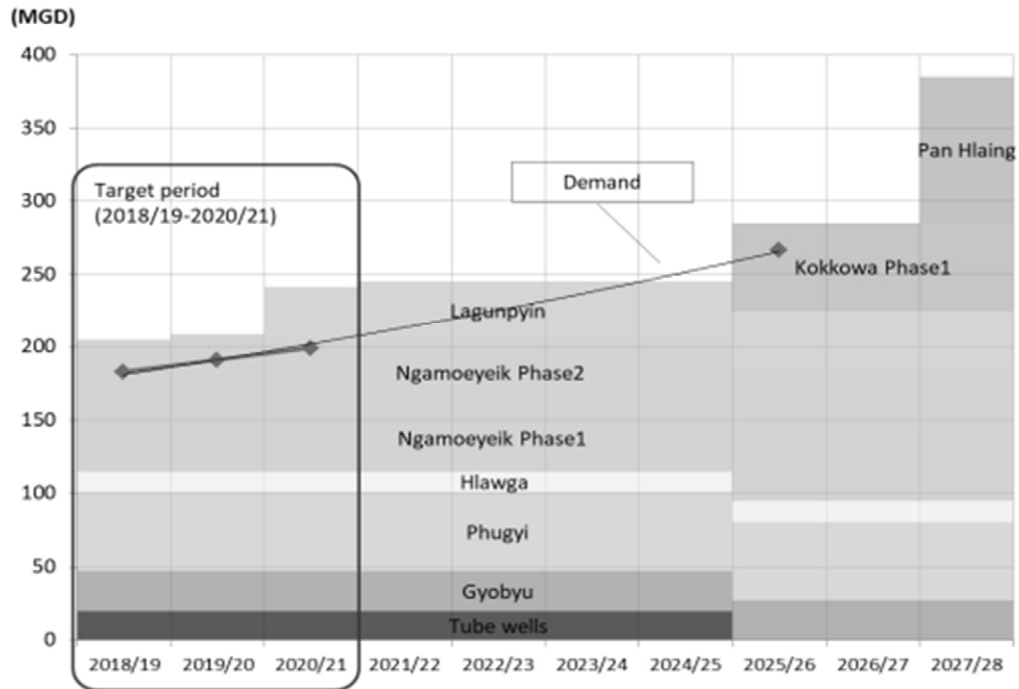
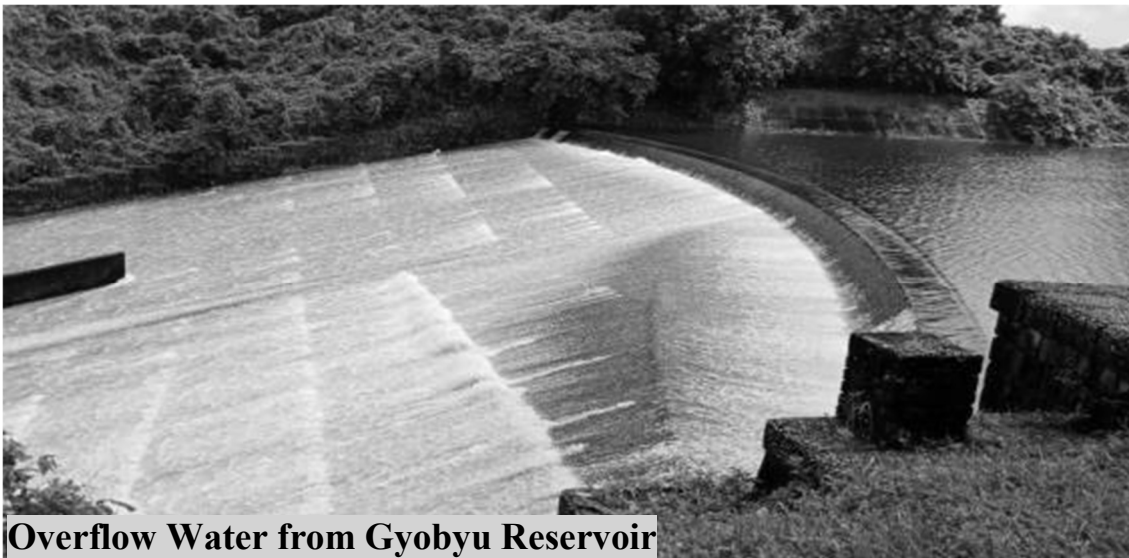


Figure 13 Water Resource Capacity and Demand (FY2018/19-2027/28)



Pipe New Extension

Pipeline category	Unit	Length			Total (km)
		2018/19	2019/20	2020/21	
Transmission & Distribution					
- Existing system	Km	29	19	12	60
- Lagunpyin project	Km	47	47	22	116
Total		76	66	34	176

*Mid-term Management Plan (FY2018/19-2020/21)
of Engineering Department Water and Sanitation (EDWS)*

Service pipe					
- Existing system	Km	129	89	179	397
- Lagunpyin project	Km	74	74	74	222
Total		203	163	253	509

Customer Expansion (connection)

	Unit	2018/19	2019/20	2020/21
Nb. of Connection (Existing system)	Conn.	345,232	350,342	355,452
Nb. of Connection (Lagunpyin)	Conn.		27,807	27,807
Total		345,232	378,149	389,259

Improvement of Water Quality

Sr. No.	Major Activities	Description
3	Establishment of Chlorine Management System	<ul style="list-style-type: none"> Working group has been established to be able to draft Chlorination Basic Plan It'll get better chlorination system
4	Development of Water Quality Improvement of 3 Reservoirs (Gyophyu, Phugyi, Hlawga)	<ul style="list-style-type: none"> Mini laboratories are set up / established to check water quality daily and get water quality data which will be used to set up treatment system for the improvement of reservoirs water quality
5	Strengthening of Water Quality Monitoring	<ul style="list-style-type: none"> To increase tap water sampling points as current tap water quality monitoring points can't meet coverage area To increase tap water monitoring frequency.



Water Quality Test on Central Laboratory

Improvement of Water Treatment Technology

Sr. No.	Major Activities	Description
6	Establishment of Chlorine Management System	<ul style="list-style-type: none"> To establish policy for chlorine disinfection in Yangon's water supply system To establish basic plan for chlorine management system in Yangon's water supply To formulate deterministic parameters for chlorine management system To assist residual chlorine analysis based on existing water pipeline network To prepare documents for existing chlorine disinfection facilities and future plan
7	Improvement of Nyaungnapin WTP treatment plan	<ul style="list-style-type: none"> To support the activities of water quality improvement at Ngamoeyeik WTP
8	Establishment of O&M of Nyaungnapin WTP	<ul style="list-style-type: none"> To support the preparation of O&M procedures and improvement plan
9	Development of Water Quality Improvement of 3 Reservoirs (Gyophyu, Phugyi, Hlawga)	<ul style="list-style-type: none"> To analyze water treatment experiments using small scale equipment (physical modeling analysis methods) at all 3 reservoirs throughout a year To prepare water quality improvement plan of all 3 reservoirs based on the results of experiments



Research for Water Treatment Design of Hlawga



pH Measuring

Reduction of NRW

Sr. No.	Major Activities	Description
10	DMA Management in Yankin Tsp, South Okkalapa Tsp, North Okkalapa Tsp, Insein Tsp & Mayangone Tsp, Shwepyithar Tsp. (NRW management in existing DMA)	<ul style="list-style-type: none"> • To know exact NRW ratio and to reduce leakage • To conduct DMA system & installation of strainer in the inlet of pipeline, it's can improve water quality • To carry out NRW management efficiently & effectively • To balance the water pressure • To make all connections metered, it enables to collect water tariff as to actual consumption amount • To test the customer meter according to the record of damage meter (function test) • Re-check with the patrol team on ground (Read or not)
11	NRW Training Yard Construction & Training	<ul style="list-style-type: none"> • To construct NRW training yard • To design the training and carry out • To be able to understand NRW management techniques and to know pipe maintenance & installation works well by practical training
12	Procurement of Leak Detectors Tools & Equipment	<ul style="list-style-type: none"> • To conduct leakage detection & repair works in time
13	Development of SOPs for NRW Management Operation & Maintenance of DMAs	<ul style="list-style-type: none"> • To be able to do NRW management activities by responsible staffs in systematic ways and to control NRW effectively
14	Create and update pipeline map	<ul style="list-style-type: none"> • To conduct completion inspection (with guideline) • To formulate as-built drawing guideline • To start creating as-built drawing
15	Collect basic data regarding NRW management	<ul style="list-style-type: none"> • Discussion with T/S engineers to formulate the data format • To train township staffs about data format
16	Grasp NRW rate periodically by data collecting on distribution and effective water (revenue, non-revenue)	<ul style="list-style-type: none"> • To install water meters at Public facilities • To calculate NRW rate with collecting customer consumption from Computer section.

*Mid-term Management Plan (FY2018/19-2020/21)
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Sr. No.	Major Activities	Description
17	Pipe laying at proper location to prevent leakage	<ul style="list-style-type: none"> To consider pipe replacement work if frequent leaks happened on the same pipe line. (Utilize leakage record)
18	Prevent leakage at branch point	<ul style="list-style-type: none"> To introduce appropriate technical method of construction and proper materials for branch part.
19	Implement water pressure test to prevent leakage	<ul style="list-style-type: none"> Compulsory to follow the training To carry out pressure test with test kits(hammer tester) exclude transmission pipe
20	Efficient leak detection/repair on existing transmission/distribution pipe	<ul style="list-style-type: none"> To formulate leak detection plan To find and repair surface leakage (with functional leak detection plan)
21	Record every leakage repair work	<ul style="list-style-type: none"> To give the leakage record with photo To show the leakage point on drawing base on the measurement of at least two points To create the leakage point map
22	Grasp situation of existing meter function.	<ul style="list-style-type: none"> To collect damaged meter data from T/S periodically to grasp actual meter situation
23	Install meter at proper location	<ul style="list-style-type: none"> To install meter systematically at proper location and suitable place. (Eg. If meters are installed under ladder, it should be installed vertically)
24	Maintain measurement accuracy of water meter	<ul style="list-style-type: none"> To prioritize to do the function test in the high water usage and high rate damage meter area
25	Secure function of large size meter	<ul style="list-style-type: none"> Need to measure pressure and flow rate and check the existing large meter whether can work or not and also for new installation of large size meter
26	Solve non-metered customer	<ul style="list-style-type: none"> To establish a water meter for customers and bill a rate based on the amount of water used.



Steering Committee(1) Meeting



Customer Survey /Meter Reading

Rehabilitation/ Replacement of Distribution and Service Pipeline

Sr. No.	Major Activities	Description
27	Replacement of Concrete Pipe to Reduce Leakage	<ul style="list-style-type: none"> • To replace damaged concrete pipe by new pipelines to reduce leakage in aged concrete pipe • That replacement can reduce/prevent NRW and increase water pressure • To design and draw the detail design of pipe replacement work of the pipeline
28	Replacement of Aged Distribution Pipe to Reduce Leakage	<ul style="list-style-type: none"> • To collect the data and analyze the aged pipe and prioritization • To replace aged pipelines (CI, PVC, Concrete) by high quality pipes to reduce leakage in old-aged pipe • That replacement can reduce/prevent NRW and increase water pressure • To design and draw the detail design of pipe replacement work of the pipeline
29	Installation of New Distribution Pipe to Increase Water Supply Pressure	<ul style="list-style-type: none"> • To collect the data and analyze the aged pipe and prioritization • To install new pipelines & pipe networks systematically, it can make water supply more sufficiently • To Install DMA system that helps reduce NRW • To connect new pipelines network as the

Sr. No.	Major Activities	Description
		<p>current pipelines pressure becomes low, for high demands of water due to the increasing number of population</p> <ul style="list-style-type: none"> • To install booster pumps to increase/ boost water pressure • To design and draw the detail design of new distribution pipelines for the improvement of water service and water supply coverage
30	Development of New Well to Enforcement of Water Supply	<ul style="list-style-type: none"> • Tube-wells are constructed as the reinforce lines in where the water pressure is low in transmission pipe lines & satellite townships • It enables to control pressure with regular maintenance of pump and valve
31	Replacement of Distribution Pumps & Valve	<ul style="list-style-type: none"> • To check the low performance pumps & valves and to replace it if it's necessary • Regular maintenance can reduce NRW and can supply water more • To replace the old pumps and valves with new ones and extending in necessary places
32	Maintenance of Transmission Pipes	<ul style="list-style-type: none"> • To carry out daily inspection along the pipe line, information sharing through social media • To maintain the transmission pipes not to happen NRW matter on the transmission line from pumping station • To clean the site along the pipeline, to remove heap of earth beside the pipelines and to do pipeline maintenance work for the sustainable of transmission pipe
33	Development of Water Transmission Monitoring System	<ul style="list-style-type: none"> • To install flow meters in the main transmission pipeline for monitoring the flow volume • To install pressure gate to monitor the data in pipelines system in time

Pipe Rehabilitation/ Replacement

Pipeline category	Unit	Length			Remarks
		2018/19	2019/20	2020/21	
Transmission & Distribution	km	4	0	5	9
Service pipe	km	79	32	55	166



Replacement of Distribution Pipe



Rehabilitation of Transmission Concrete Pipe



Replacement of Distribution Pipe

Enhancement of Customer Service

Sr. No.	Major Activities	Description
34	Improvement of Billing & Collection System	<ul style="list-style-type: none"> • To implement an improvement plan of customer database management, which enable to; <ul style="list-style-type: none"> ✓ Sharing customer information timely ✓ Managing customer consumption ✓ Digitalizing manual works, etc. • To increase overall collection ratio • To consider more efficient bill payment system for customer such as MPU, banking and other system • To standardize the operational flow of billing collection in T/S

Enhancement of Human Resource Development

Sr. No.	Major Activities	Description
35	Formulation of Human Resource Development Plan	<ul style="list-style-type: none">• To prepare Human Resource Development Plan to recruit and develop human resources in the planned manner
36	Continuous Implementation of Prioritized Training Course	<ul style="list-style-type: none">• To continuously carry out training courses to meet the needs and the priority;<ul style="list-style-type: none">✓ New staff training✓ Senior staff training✓ Basic PC skill training, etc.• To upgrade and increase the line-up of the training courses• To enrich facilities/equipment for training
37	Promotion of OJT	<ul style="list-style-type: none">• To promote an opportunity of practical OJT training to improve/develop the capacity of staff• To provide more opportunity to work together with junior staff and senior staff, and to transfer knowledge/ expertise/ know-how from senior staff to train junior staff



Training Course for Township Engineer



Award Ceremony of Computer Training

Organizational Re-arrangement

Sr. No.	Major Activities	Description
38	Improvement of Institutional Governance	<ul style="list-style-type: none"> • To consider and improve institutional governance for more efficient and effective waterworks management • To improve the governance to adapt the developed technologies • To make accountable for applying Law and Regulations with clear explanation and information provision • To enhance promotion of the existing staff • To improve and motivate the interests of staff for efficient workflow
39	Re-arrange Organization and Strengthen Management-base for Efficient Management Process of Water Utility	<ul style="list-style-type: none"> • To re-arrange the existing organization to fulfil the needs of public in time • To optimize the organizational function by integration, separation and new establishment etc. • To update the organization chart to be relevant with existing situation • To appropriately allocate the staffs to meet the advanced or developed technology/subjects
40	Establishment of Planning System	<ul style="list-style-type: none"> • To continuously formulate planning system and to strengthen its function • To optimize and to improve the established system in this mid-term • To monitor and review the Mid-term Management Plan by PDCA cycle every year • To realize the monthly collection of PIs data from the relevant sections

Promoting Preparation of Tariff Revision

Sr. No.	Major Activities	Description
41	Preparation of Accounting Policy and Accounting System	<ul style="list-style-type: none"> • To prepare the transformation of government accounting system into corporate accounting system to achieve the future image of EDWS "The Waterworks is managed as an independent and Financially Self Sufficient Utility".
42	Preparation of Water Tariff Setting Policy	<ul style="list-style-type: none"> • To prepare the policy to systematically raise water tariff that can cover the following expenses <ul style="list-style-type: none"> ✓ O&M cost, depreciation cost, interest repayment and loan repayment • To take into account the increasing water demand and the necessity of large investment in future

Development of Regulation/Standard/Guideline/Manual (RSGM)

Sr. No.	Major Activities	Description
43	Development of SOPs for Water Quality Management, NRW, Township Operation, O&M of facilities	<ul style="list-style-type: none"> • To develop new SOPs to standardize the operational activities of EDWS • To upgrade the existing d to be systematic ones • To review and implement training for effective use of SOPs in working places

5. Financial Plan

5.1. Three-Years Operating Income Forecast

Over the next three years, EDWS is envisaged to grow its income from 11,500 million Kyat in 2017/18 to 26,375 million Kyat in 2020/21. The annual increase ratio is expected to be 32% from 2017/18 to 2020/21. One of the key milestones is the starting operation of Lagunpyin WTP for Thilawa SEZ and domestic during the mid-term. Hence, the above operating income will be underscored by achievement of incremental operating profit by water supply of Lagunpyin WTP.

Operating income for the next three years is summarized as follows.

Table 9 Operating Income Forecast for FY2018/19-FY2020/21

Items	Projection by fiscal year (mil. Kyat)		
	2018/19	2019/20	2020/21
A. Operating Income Total	12,000	19,598	26,375
1 Water service charge	11,419	16,291	23,069
1-1 Department	1,600	1,600	1,600
1-2 Public Water Charge	9,819	9,819	9,819
1-3 Incremental revenue by improvement - Domestic		163	481
1-4 Incremental revenue by improvement - Comm.		136	401
1-5 Incremental revenue by Lagunpyin		4,574	10,768
1-6 Incremental revenue by new customer (Existing system)		275	275
2 Water connection fee	450	450	450
Incremental revenue by Lagunpyin		2,450	2,450
3 Rental of shops and sites	70	70	70
4 Plumber license fee	1.3	1.3	1.3
5 Toll fee	0.1	0.1	0.1
6 Other incomes	60	60	60

5.2. Three-Years Operating Cost Forecast

Operating costs is assumed to increase 19,259 million kyat in 2017/2018 to 27,016 million kyat in 2020/21. The annual increase ratio is 13% from 2017/18 to 2020/21. During the period of this mid-term, operating costs for Lagunpyin WTP will be incrementally occurred.

Operating costs for the next three years is summarized as follows.

Table 10 Operating Costs Forecast for FY2018/19-FY2020/21

Items	Projection by fiscal year (mil. Kyat)		
	2018/19	2019/20	2020/21
A. Operating Expenditure Total	22,319	24,566	28,013
2-1 Salary	2,658	3,008	3,273
2-2 Labor charges	2,084	1,877	2,042
Incremental personnel costs by Lagunpyin	-	71	124
2-3 Electricity	9,800	13,322	14,494
Incremental electricity costs by Lagunpyin	-	189	1,308
2-4 Petro & Lubricant	100	90	97
2-5 Procurement	3,339	1,925	2,094
Incremental chemical costs by Lagunpyin	-	23	162
2-6 Printing & Publishing	50	73	80
2-7 Materials, repair, maintenance and spare parts	4,178	3,909	4,253
2-8 Other expenditure	111	79	86

5.3. Net Operating Balance

The net operating deficit is estimated to be 10,319 million Kyat in FY2018/19, however it is expected to be an upward trend and the deficit will be largely recovered with 1,638 million Kyat deficit in FY2020/21. Hence, a significant target of financial management during the next three years could be mostly close to operating cost recovery. The net operating balance in FY2020/21 will be significantly dependent on the successful operation of Lagunpyin WTP and the appropriate billing and collection on schedule.

Table 11 Operating Balance Forecast for FY2018/19-FY2020/21

Items	Projection by fiscal year (mil. Kyat)		
	2018/19	2019/20	2020/21
A. Net Operating Balance	-10,319	-4,968	-1,638
Operating Income	12,000	19,598	26,375
Operation Expenditure	22,319	24,566	28,013

[Note] Operating costs does not include depreciation costs

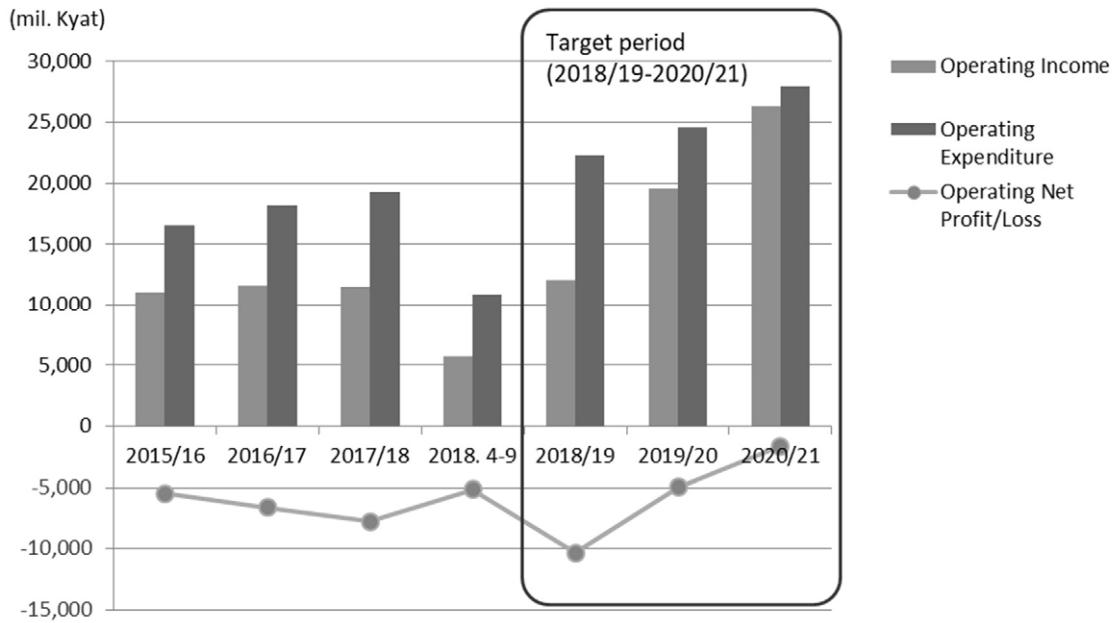


Figure 14 Net Operating Balance (Past and Projection for 2018/19-2020/2021)

5.4. Three-Years Capital Expenditure and Investment Forecast

The capital investment needs over the next three years will amount to 730,833 million Kyat, equivalent to the annual average of 243,611 million Kyat. This investment is necessary to construct water facilities to meet the future water demand of Yangon City. The major portion of investments for the mid-term covers the costs of on-going ODA projects such as Lagunpyin and Kokkowa projects.

Approximately 70% of the capital investment will be sought from donor funding of the Japanese government, and the remaining portion will be covered by the Union government budget.

Capital expenditure required for the next three years is summarized as follows.

Table 12 Capital Expenditure Forecast for FY2018/19-FY2020/21

Items	Fiscal year (mil. Kyat)		
	2018/19	2019/20	2020/21
B. Capital Expenditure	153,001	286,656	291,176
1 ODA Loans	126,419	256,992	257,628
1-1 Lagunpyin WS Project (Total)	96,644	76,392	46,490
1-1-1 Lagunpyin WS Project (YCDC)	19,051	13,692	10,740
1-1-2 Lagunpyin WS Project (ODA)	77,593	62,700	35,750

*Mid-term Management Plan (FY2018/19-2020/21)
of Engineering Department Water and Sanitation (EDWS)*

Items	Fiscal year (mil. Kyat)		
	2018/19	2019/20	2020/21
1-2 Kokkowa River WS (Total)	29,775	180,600	211,138
1-2-1 Kokkowa River WS (YCDC)	9,775	29,931	45,988
1-2-2 Kokkowa River WS (ODA)	20,000	150,669	165,150
2 YCDC activity	26,582	29,658	33,543
2-1 Intake & Treatment	1,836	5,782	3,905
2-2 Transmission & Distribution	8,125	13,071	16,747
2-3 Service pipe & Meter	9,795	5,991	7,901
2-4 Other infrastructure	6,827	4,815	4,990

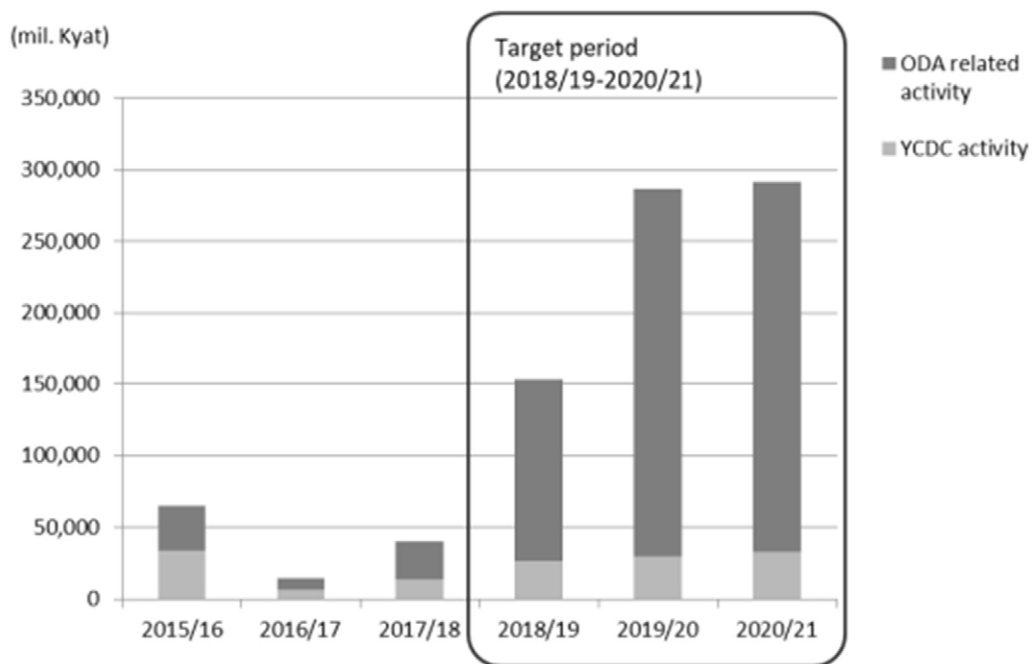


Figure 15 Capital Expenditure (Past and Projection for 2018/19-2020/21)

APPENDIX

1. Future Image of EDWS (Capacity Development Concept)
2. Institutional Re-organization Plan of EDWS
3. Management Improvement Plan of EDWS
4. Activity List for FY2018/19-FY2020/21

APPENDIX-1: Future Image of EDWS (Capacity Development Concept)

See Annex-3.A: Future Image of WRAWSA.

APPENDIX-2: Institutional Re-organization Plan of EDWS

See Annex-3.B: Report on Institutional Reorganization of WRAWSA.

APPENDIX-3: Management Improvement Plan of EDWS

**[Executive Summary]
Management Improvement Plan**

Chapter 1 Introduction

Objectives of Management Improvement Plan

In order to improve the Water Supply system of YCDC which is supplying water to Yangon City daily, Management Improvement Plan is required to be prepared to achieve 5 objectives of EDWS.

In the attempt of achieving the objectives, only if we can learn the existing problems, analyze those and resolve those, the objectives will be reached out. To reduce and solve those issues, the existing administration system should be transformed into Autonomous Administrative System – Autonomy. The present organization structure should also be revised to become an effective and efficient organizational structure with divisions clarifying clear duties and responsibilities. Transforming the existing financial management system into proper and more effective management system plays the main role for EDWS to stand out.

Meanwhile, Water Supply related Regulations, Standards, Guidelines, and Manuals should be revised and established in accordance with the circumstance, time and situation. To keep following those RSGMs in harmony is requisite.

Thus, as the objectives will be achieved only if the above-mentioned required revision and amendment, improvement, extension, HR development can be implemented, this Management Improvement Plan inclusive of proposals in six aspects is prepared.

Process of Preparation

Concerning the current situation and facing challenges of EDWS, some studies and investigations had been done with the coordination of JICA TA Team. Based on those analyses, improvement project is planned to be implemented in order to develop working situations and to improve the water supply system from every angle.

In that project, three main aspects are included as Institutional Management, NRW management, and Water Quality Management, and it has been implementing by JICA Experts and EDWS staffs as counterparts.

Moreover, neighboring countries' successful water supply system and management system improvement & reform are visited and learned. Based on the studies, the findings, advantages, and disadvantages are compared with EDWS and how those are associated with the current situation of EDWS is analyzed. Based on the results of the analysis, "Management Improvement Plan" proposal is designed and proposed to improve the Yangon City water supply industry in more advanced and successful.

Chapter 2 Management Improvement Area

2.1 Institutional Governance

1) To practice Autonomous System

If we become autonomous organization, as the benefit, it will be easier to draft necessary guidelines/ regulations and issue the internal order quickly.

It's much easier to allocate/ assign the duties, responsibilities, perform the work. When it can stand as Water Supply Authority, the organization will have the benefits such as making plans to increase the income and expenditure ratio within the department to promote the momentum of business operation, making fast and accurate decisions within the department, and intensive supervision on activities in details.

2) To get approval from respective ministry for budget allocation

Based on our performance and support from the government, we propose to act as an organization that manage the income and expenditure so that financial allocation regarding water distribution can be processed in timely manner; better and faster assessments to be made and implementation of necessary conditions for the 100% fulfilment of public water requirement can be done. And so, to be able to stand as such an organization, instead of getting approval from Union government by submitting step by step, it should get approval by the relevant ministry's authority for the budget allocation.

Proposal for Improvement

1. To practice Autonomous System
2. To get approval from respective ministry for budget allocation

2.2 Organization Structure of Water Utility

It's necessary to extend applied technology division to be able to implement specific work operations and task allocation systematically. It's proposed to redraw/reorganize the organization structure to enhance the department's activities using advanced technologies and when implementing the strategic plan for the improvement of water supply management of YCDC step by step, it's necessary to expand the sections/divisions which can be able to use modern technologies and perform the work effectively.

The extended Divisions/Sections in New Organization Structure are-

1. Planning Section
2. NRW Management Section
3. Customer Service Section
4. Water Treatment Section
5. GIS Section
6. Transmission and Distribution Section
7. Human Resource Development Section

The purpose/objective of setting division and section are as follow:

No	New Section	Reason
1	Planning Section	To manage overall planning of EDWS, facility planning such as water demand and supply, water production and water distribution.
2	Transmission and Distribution Section	To maintain transmission and distribution pipes and to supervise its related works.
3	GIS Section	To keep customer data and geometry information of tube wells, distribution pipes, transmission pipes, service reservoirs, WTPs and Reservoirs concerned with Water Supply System by applying GIS system.
4	NRW Management Section	To perform to solve the difficulties concerned with Non-Revenue Water, to analyze the causes, to collect information and data of supplied water and to analyze performance indicators. Moreover, NRW Management Section is responsible to control NRW in present and future by implementing short-term and long-term projects.
5	Human Resources Development Section	To manage human resource development issues including HRD, salary payment, personnel management and social affairs of staff of EDWS, YCDC.
6	Water Treatment Section	To manage of Water Treatment Infrastructures, water resources sharing and its related works, water resources prevention and its related works, maintenance of water treatment system and its related works and water treatment researches, and to share technics and findings within department.
7	Customer Service Division	To perform the works such as tackling the customers complains, giving information to customers concerned with water supply and sanitation work, inputting the meter consumption unit and water charges, supervising to collect water tariff fully, managing the statistic works concerned with water tariff income, improvement of E-government system, drawing up the manual and guideline for billing and collection work and improvement of the services related to customer's needs.

2.3 Planning System

As the objective of EDWS, we have been trying to distribute sufficient, clean and drinkable water to city dwellers every day.

So, to meet this objective, it's required to implement by drafting/setting Strategic Plan for the enhancement of the capacity of department, to be able to collect water tariff fully, to prevent NRW, and for the improvement of water supply system using modern technology.

1) Setting Short-Mid Plan

As our department set 30 years master plan, it's necessary to set short, mid-term plan and perform to meet the master plan.

2) Drafting proposed plan

As the main duties of Planning section; drafting necessary plans by collaboration with other section, implementation, analyzing on the results, and sustainable development are needed to start to operate.

3) Collecting Necessary Data

The main condition is to be able to collect and get exact data concerned with water supply from each section/ division.

4) Drafting Business Plan by setting KPIs

It's proposed to draft Business plan and implement it by selecting KPIs based on PIs. So, we can stand as a sustainable successful water supply organization in the long-run. It is in great necessity to prepare the necessary business plan to supply the water, the basic need of city-dwellers, sufficiently.

5) Making evaluation as to PDCA Cycle

It's necessary to evaluate the implementation situation in every six months after drafting 3 to 5 years as mid-term plan. For long term success, PDCA should be aimed as a long-term system for planning, implementation, checking and action to analyze and criticize on the emerging difficulties and deviation of the projection, to be taken action.

6) Capacity Development

As Planning section is started to establish in our department, it's necessary to understand what the duties and responsibilities of planning section are, and also the staff must have full capacity to be able to understand and perform the works. It's to enhance capacity development program by learning in planning section of other organization, sharing by the officials within department, and the staffs themselves have much enthusiasm and active to learn on their works.

7) Practice Water Safety Plan

It's required to draft Water Safety Plan and practice it to be able to distribute clean, fresh and drainable water every day to city dwellers.

2.4 HRD

Human Resources plays a main role because infrastructure, facilities and financial resources have to be operated by human resources. To achieve the mission and vision of EDWS.

New staffs are the future image of EDWS. To train new staffs systematically is the most important.

The priority can be put for HR development;

- 1) Implementing HRD as soon as possible

- 2) Shaping effective **Organization**
- 3) Making **HRD Plan**
- 4) Allocating proper **duties and responsibilities**
- 5) Allocate HRD **budget**
- 6) Bringing up internal **trainers** with TOT
- 7) Planning training **program** according to the levels of staffs
- 8) **Training management** according to PDCA cycle
- 9) Improve **OJT** System
- 10) Encourage **Self-learning** system
- 11) Setting **Personal Evaluation** Policy
- 12) Initiate **incentive system**

2.5 Corporate Accounting

1) Accounting Policy

Concerning with Accounting, exact and secure policy, rules & regulations, guidelines and manuals should be set. Each division/section should follow the policy and rules. And accounts, figures and financial data will be kept systematically and it would be supportive for data checking and analysis. Systematic data recording will be helpful for future projects.

2) Accounting System

The Government Accounting System practicing in EDWS must be transformed into Corporate Accounting System. In order to introduce Corporate Accounting System, it must prepare Profit & Loss (P/L) and Balance Sheet (B/L) which needs Depreciation Account. In order to make a Depreciation Account, Depreciation Rate should be defined and set urgently.

3) Asset Accounting

As Assets data cannot be input correctly and assets list with all necessary data could not be collected, finance section is facing difficulty to make depreciation account. Asset data/figure in every step from procurement or construction stage to throwing or breaking down the expired asset should be recorded. Moreover, Asset ID Code and Classification Code system should be established and exact and clear format, process and procedure of fixed asset registration should be initiated. Asset accounting trainings should also be highlighted.

4) Income & Expenditure

As Income & Expenditure ratio is highly diverse, EDWS should mainly concentrate to collect water tariff fully which is the main income of the revenue as well as to explore the various ways to achieve increased income. The existing meter maintenance fee is not in conformity with this era. The charges of Raw Water from Irrigation Department has also increased five times, and the electricity charges seems to rise soon and the price of water treatment chemical and other accessories is becoming higher and higher gradually. Thus, as those factors will make the gap of Income and Expenditure ratio larger, meter maintenance fee should be slightly increased so that it can become helpful to increase the income.

5) Water Tariff

In considering the Loan repayment for ODA Loan (Japan) in 2025, EDWS should ruminant to plan some projects to set Water Tariff based on Full Cost Recovery Principle or Sustainable Cost Recovery in order to cover the financial crisis in the future. To do so, we should make a comparison of situation and management system of Waterworks in Japan, MWA in Thailand, PPWSA in Phnom Penh, and EDWS and, should analysis it and perform to increase income mainly and urgently.

6) Roadmap to improve financial situation

(Million Kyats)

Titles	2016-2017	2017-2018	2018-2019	
Current Income	11155.495	11100.00	-	
Water meter selling	548.847	450.000	-	
ODA (LOAN)	3325.772	58917.000	81940.000	
Grant	1172.325	-	-	
Current Expenditure	18153.378	19250.300	-	
Capital Expenditure	19396.504	83111.500	122711.737	

*EDWS is planning to increase the water tariff in 2018-2019.

2.6 Standards, Guidelines, Regulations and SOP

It's intended to set Standards, Guidelines and Manuals for Water Distribution Work, Water Supply Facilities Construction works, Designs and water supply materials, Electrical and Mechanical Works for the improvement of Water Supply System of EDWS (YCDC).

1) Setting accurate/exact Standards, Guidelines, Manuals and SOPs

To be able to practice contract system systematically as to the Standards, Guidelines, Manuals and SOP which are set by Department. The operation, maintenance and procurement of water supply materials/facilities can be done according to Standard, Guidelines and Manuals.

Establish the checking and maintenance section which can take the responsibility of testing water supply related equipment and of its maintenance works according to RSGMs in order to be able to use the full life-span of the standard materials and equipment related with water supply.

2) To keep Evaluation/ Assessment Record

When implementing contract project/work, if we keep evaluation/assessment record to track the project improvement and cash flow, there won't be **Lack of Supervision** (=gap of responsibilities) between the Contractor and Supervision Engineer and there will be facilitation of the work flow.

3) Design Criteria

By drafting the design criteria in details, we can get any project done in a standardized quality no matter which engineer works for it.

4) To formulate organization structure and requirement for its operation and Time Schedule

Implementing the works systematically and speedy, strong coordination among the sections, allocating the specific duties according to the respective section will help the working operation to be smooth.

5) Collaboration with other organizations

By collaboration with other organizations since drafting project design, while in progress, the work won't delay, losses and can reduce the cost and the design becomes the safest and suitable one.

6) Survey & Drawing

If it's drafted detail drawing using data such as Pipe line fitting, trees, lamp post, sign board, the water shortage/cut off condition while the work is in progress, the work on ground condition will goes smooth.

7) Technologies

Using modern technologies for Pipe Line Design, Valves, Valve Chambers, Concrete Block and Fire Hydrant, it's will support water supply work well.

If Planning Section, Survey and Drawing Section, Estimate Section and GIS section have the link each other's, the work can be done easily and the detail respective data can be stored/kept in respective section.

8) To stop utilizing tube-wells and ground water

By shutting down the tube-wells and distribute the water sufficiently, it can protect Soil Settlement and underground water losses.

9) DMA System

If DMA system is used/ conducted while making survey & Design of Pipe line, the flow meter can be able to be installed at the necessary points and as the benefit of it, we can succeed management of water supply system, Operation & Maintenance work efficiently and reduce NRW.

Chapter 3 Implementation Strategy

To implement the proposed six aspects, the detailed plans should be prepared and contained in the project as Mid-term plan. To get the accurate basic data & information and Performance Indicators required to make plans, EDWS staffs should perform to improve data collection or data keeping according to the instructions of EDWS officers.

Making plans (Plan) for the prioritized activities based on the collected PI data, implementing the plans (Do), checking and analyzing the implementation during and after (Check) and improving the results for the next round (Action) – PDCA cycle will be performed according to PDCA cycle to improve and succeed more. The plans will be implemented with the coordination of JICA Technical Assistance Team and EDWS staffs supervised by EDWS in-charged officers.

In order to implement all the proposed aspects, the approval from the respective government is required to become an Autonomy, to revise and set water tariff rate, and to establish financial management system. Similarly, negotiations with the Office of Attorney General, Economic Committee, Ministry of Finance and Planning, and Ministry of Commerce must be carried out.

Concerning with the implementation of the proposed plans, three Steering Committee is formed to suggest and supervise on plan implementation and based on the suggestions and requirements, the revised action will be performed.

APPENDIX-4: Activity List for FY2018/19-FY2020/21

C	1	101	လာသည့်နေ့ (၇) နေ့အတွင်း (၂) နေ့အတွင်း 90mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း (၅၀၀) နေ့အတွင်း	Laying 90mm Ø HDPE reinforced pipe (350') in 23th St (Lower Bl), Ward 7, Lathar Tsh	7	15-2
C	1	102	လာသည့်နေ့ (၅) နေ့အတွင်း (၅) နေ့အတွင်း 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း (၅၀၀) နေ့အတွင်း	Laying 110mm Ø HDPE pipe (400') and 160mm Ø HDPE pipe (700') in Shwedagon Pagoda Rd, Ward 9&10, Lathar Tsh	13	15-3
C	7	103	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI Main Pipe အား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing decayed 6" Ø CI pipe with 160mm Ø HDPE pipe (850') in 28th St (Upper Bl), Ward 5, Pabedan Tsh	16	13-1
C	7	104	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI Main Pipe အား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI main pipe with 160mm Ø HDPE pipe (850') in 31st St (Upper Bl), Pabedan Tsh	16	13-2
C	7	105	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI Main Pipe အား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing decayed CI pipe with 160mm Ø HDPE pipe (300') bet. ShteBonThar St and 29th St, in Mahar Bandhoola Rd, Ward 7, Pabedan Tsh	9	
C	7	106	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI Main Pipe အား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing decayed CI pipe with 160mm Ø HDPE pipe (300') bet. 27th St and 28th St, in Mahar Bandhoola Rd, Ward 4, Pabedan Tsh	9	
C	7	107	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI main pipe with 160mm Ø HDPE pipe (850') in 40th St (Middle Bl), Ward 9, Kyauktada Tsh	17	10-4
C	7	108	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI main pipe with 160mm Ø HDPE pipe (850') in 38th St (Upper Bl), Ward 6, Kyauktada Tsh	17	10-3
C	7	109	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI main pipe with 160mm Ø HDPE pipe (850') in 35th St (Upper Bl), Ward 3, Kyauktada Tsh	17	10-1
C	7	110	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI main pipe with 160mm Ø HDPE pipe (850') in 37th St (Upper Bl), Ward 5, Kyauktada Tsh	17	10-2
C	7	111	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 4" Ø Concrete pipe with 110mm Ø HDPE pipe (2485') in Marawathi St, Pyaw West Ward, Dagon Tsh	21	12-4
C	7	112	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 4" Ø Concrete pipe with 110mm Ø HDPE pipe (2450') in Pyhtangyung Avenue St, Pyaw West Ward, Dagon Tsh	21	12-5
C	7	113	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 4" Ø Concrete pipe with 110mm Ø HDPE pipe (650') in Min Kyang St, Pharyargyi Ward, Dagon Tsh	7	12-2
C	1	114	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 160mm Ø HDPE pipe (650') in BoGyoke Museum St, Bo Cho Ward, Bahan Tsh	30	14-17
C	1	115	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 110mm Ø HDPE pipe (1400') in Wingabar Lane, NgarHatKy West Ward, Bahan Tsh	14	14-18
C	1	116	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 90mm Ø HDPE pipe (600') in SakChan St and Ma Kye Kye St, NgarHatKy South Ward, Bahan Tsh	5	14-20
C	1	117	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 75mm Ø HDPE pipe (1200') in PhoeSein St, Bahan Tsh	18	14-21
C	1	118	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 160mm Ø HDPE reinforced pipe (1200') from the end of Wingabar St to NgarHatKy Junction, NgarHatKy West Ward, Bahan Tsh	14	14-9
C	1	119	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 90mm Ø HDPE extension pipe (500') KohMinKohChin Lane - 39th Sub-Lane, NgarHatKy TawYa Ward, Bahan Tsh	4	14-19
B	1	120	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Installing 7.5 KW Pump for water adequacy of all blocks in upper part of NgaMaik St, KyaiKaSan Ward, Bahan Tsh	6	14-11
C	1	121	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 110mm Ø HDPE extension pipe (1000') for the houses with lack of water connectors in OuThaPhaYar St, KyaiKaSan Ward, Bahan Tsh	35	14-12
C	1	122	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 160mm Ø HDPE new pipe (7000') in BoCho Ward 2, NgarHatKye South Ward, NgarHatKye West Ward, Bahan Tsh	82	14-2
C	1	123	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 160mm Ø HDPE new pipe (2300') in SayerSan Rd (left side), Bahan Tsh	28	14-14
C	1	124	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 160mm Ø HDPE extension pipe (3000') in SayerSan (North) East Ward, Bahan Tsh	36	14-15
C	1	125	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 110mm Ø HDPE extension pipe (1000') in Gyar TawYa St, Gyar TawYa Ward, Bahan Tsh	10	14-16
C	1	126	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 110mm Ø HDPE extension pipe (3000') in TharTaNa YeikThar St, TharTaNa YeikThar Ward, Bahan Tsh	30	14-24
C	1	127	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 160mm Ø HDPE extension pipe (3000') in new YayTarShay St (from West ShweGonDine Rd to ShweGonDine Traff light), YayTarShay Ward, Bahan Tsh	36	14-25
C	7	128	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI pipe with 160mm Ø HDPE pipe (2840') in Sanchaung St, San North Ward, Sanchaung Tsh	48	11-1
C	7	129	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI pipe with 160mm Ø HDPE pipe (1320') in KHiTar St, Thiri Khaymar Ward, Sanchaung Tsh	22	11-2
C	7	130	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI pipe with 160mm Ø HDPE pipe (1658') in MaGyi St, Monte Taung Ward, Sanchaung Tsh	28	11-3
C	7	131	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI pipe with 160mm Ø HDPE pipe (1150') in MaPo St, Meyein (North) Ward, Sanchaung Tsh	19	11-4
C	7	132	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 4" Ø CI pipe with 110mm Ø HDPE pipe (850') in Moemakta St, Monte Let Saung Kone Ward, Sanchaung Tsh	14	11-5
C	7	133	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 4" Ø CI pipe with 110mm Ø HDPE pipe (700') in ThinMingalar St, MeyeinGone (North) Ward, Sanchaung Tsh	8	11-7
C	7	134	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI pipe with 160mm Ø HDPE pipe (1000') in MaLuPin St, KyunTaw (South) Ward, Sanchaung Tsh	13	11-8
C	7	135	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI pipe with 160mm Ø HDPE pipe (11050') in PhyaPon St, KyunTaw (Middle) Ward, Sanchaung Tsh	14	11-6
C	7	136	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 4" Ø CI pipe in ThaYatTaw St 3 and 4" Ø PVC pipe in ThaYatTaw St 4 with 110mm Ø HDPE pipe (1800') ThaYatTaw (South) Ward, Sanchaung Tsh	17	9-5
C	7	137	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 4" Ø CI pipe with 110mm Ø HDPE pipe (700') in NyungPin St, MeyeinTaung East Ward, Sanchaung Tsh	8	
C	7	138	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI pipe with 160mm Ø HDPE pipe (800') in SaGaSein St, Ahone Tsh	15	17-5
C	7	139	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI pipe with 160mm Ø HDPE pipe (1100') in HrinSiKone St bet. Strand Rd and Lower Kyeemyindine Rd, in SawEast Ward, Ahone Tsh	21	17-6
C	7	140	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI pipe with 160mm Ø HDPE pipe (1000') in HrinSiKone St (bet. Lower Kyeemyindine Rd and MinYeKyeWaw Rd), in SawEast Ward, Ahone Tsh	19	17-7
C	1	141	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 160mm Ø HDPE (5400') in Mitharsu Ward and YeikThar Ward, Seikkan Tsh	99	
A		142	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Building two (20000 gallons) tanks for water storage in Seikkan Tsh	44	
South District						
D	1.6	143	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Installation of three 12" Ø Flow Meters and chambers in MEPE-factory pipeline, Thawana PIS, Thadahaung PIS in Tharkayta Tsh	5	19-13
C	7	144	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø CI pipe with 160mm Ø HDPE pipe (4000') in HuPaYone St, HuPaYone 1 Ward, Tharkayta Tsh	45	19-9
C	7	145	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Removing spaghetts pipe - 90mm Ø HDPE (4000') in Yuzana Housing inside Mpa Kwar Nyo Housing Compound, 7-West, Tharkayta Tsh	20	19-17
C	1	146	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Laying 160mm Ø HDPE (1000') in Nawarat St, Ward 99, Tharkayta Tsh	15	15
C	7	147	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 90mm Ø HDPE pipe (700') in MarPjay 22 St, MarPjay Ward, Tharkayta Tsh	5	
C	7	148	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 4" Ø PVC pipe with 110mm Ø HDPE pipe (800') in DhammarYone St, 7/East Ward, Tharkayta Tsh	8	
C	7	149	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (700') in 13th St, ZayyarThiri Ward, DawPon Tsh	7	20-1
C	7	150	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (700') in 12th St, ZayyarThiri Ward, DawPon Tsh	7	20-2
C	7	151	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (400') in ThirBawKyn 2 St, ThirBawKyn Ward, DawPon Tsh	4	20-3
C	7	152	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (400') in ThirBawKyn 2 St, ThirBawKyn Ward, DawPon Tsh	4	20-4
C	7	153	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (395') in Kwet Thil 1 St, Yamonnar 1 Ward, DawPon Tsh	4	
C	7	154	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (298') in 13th St, Yamonnar 1 Ward, DawPon Tsh	3	
C	7	155	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (450') in 15th St, Yamonnar 1 Ward, DawPon Tsh	4	
C	7	156	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (320') in AungMyitTar (middle) St, Yamonnar 1 Ward, DawPon Tsh	3	
C	7	157	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (320') in AungMyitTar (Upper) St, Yamonnar 1 Ward, DawPon Tsh	3	
C	7	158	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (200') in 12th St, Yamonnar 1 Ward, DawPon Tsh	2	
C	7	159	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (200') in 12th St, Yamonnar 1 Ward, DawPon Tsh	5	
C	7	160	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (530') in ThirBawKyn 5th St, ThirBawKyn Ward, DawPon Tsh	5	
C	7	161	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 3" Ø PVC pipe with 110mm Ø HDPE pipe (530') in ThirBawKyn 7th St, ThirBawKyn Ward, DawPon Tsh	3	
C	7	162	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø GI pipe with 160mm Ø HDPE pipe (1870') in AhYoeKone St, ThirBawKynAhYoeKone Ward, Tamwe Tsh	28	21-4
C	7	163	ပင်ဆန်းမြို့နယ် (၅) နေ့အတွင်း (၅) နေ့အတွင်း ၆" Ø CI ပိုင်းအား 160mm Ø HDPE ပိုင်း (၅၀၀) နေ့အတွင်း	Replacing 6" Ø GI pipe under pavement (in right and left sides of BaNyarDala Rd) with 160mm Ø HDPE pipe (7500'), BaNyarDala Rd, Tamwe Tsh	106	

(2) Activity List for FY2019/20-2020/21

**Mid-Term Plan -Activity Summary-
FY2019/20-20/21**

Categories	Sr. No.	Priority No. by Policy	Priority No. by T/S	No.	Project Name	Project Name (English)	Fund	Cost (mil. kyat)	
								FY2019/20	FY2020/21
EAST DISTRICT									
North Okkalar									
D	1	4	1	၁-၃	မြောက်ပိုင်းရွာအတွင်း (၁)ကွက်တွင် မြေရိပ်ခန်းနှင့် သူနာကျန်းမာရေး မြှုပ်နှံခန်း (၈၀၀' x ၅၀၀') ဖြည့်ဆည်းပေးခြင်း။	Building the fence in ground pond (800' x 500') between Nweni Street & Thu Nandar Street, Ward (E), North Okkalapa Township.	YCDC	40	
C	1	1	2	၁-၄	မြောက်ပိုင်းရွာအတွင်း သူနာကျန်းမာရေးမြှုပ်နှံခန်းအတွက် ဆိုက်ဘယ် သူနာကျန်းမာရေး 8'0" CI အား 200 mm HDPE ပိုင်း (၄၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Laying 200 mm HDPE Pipe (4850') in the place of 8'0" CI from N/Okkr Circle to ThuNandar Rd along ThuDhammar Rd in N/Okkr Tsh	YCDC	76	
C	1	7	3	၁-၆	မြောက်ပိုင်းရွာအတွင်း မေပေါက်လမ်းကြောင်းအတွက် သူနာကျန်းမာရေး ဝေဘာလမ်းဆုံပေါ် 6' 0" CI ပိုင်းအား 160 mm HDPE Pipe (၁၂၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Laying 160 mm HDPE Pipe (12000') in the place of 6'0" CI Pipe along KhayMarThi Rd from ThuNanDar Crossroad to WaiBarGi Junction	YCDC	102	
C	1	7	4	၁-၈	မြောက်ပိုင်းရွာအတွင်း (၆)ကွက်တွင် မြေရိပ်ခန်းအတွက် 3' 0" PVC ပိုင်းနှင့် 110 mm HDPE Pipe (၁၂၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Replacing 110 mm HDPE Pipe (5200') in the place of 3'0" PVC Pipe from OakKar-1 St to OakKar-8 St, Ward - C, N/Okkr Tsh	YCDC	40	
C	1	7	5	၁-၉	မြောက်ပိုင်းရွာအတွင်း ဝေဘာလမ်းဆုံအတွက် 12' 0" CI ပိုင်းအား 200 mm HDPE Pipe (၄၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Replacing 200 mm HDPE Pipe (8500') in the place of 12'0" CI Pipe from BoGyoke Rd Junction to MayDarWi Rd, along WayBarGi Rd, N/Okkr Tsh	YCDC	248	
C	1	7	6	၁-၁၀	မြောက်ပိုင်းရွာအတွင်း သူနာကျန်းမာရေးမြှုပ်နှံခန်းအတွက် 6' 0" CI ပိုင်းအား 160 mm HDPE Pipe (၆၅၀၀) ဖြည့်ဆည်းပေးခြင်း။	Replacing 160 mm HDPE Pipe (6950') in the place of 6'0" CI Pipe from ThuNanDar Rd Junction to WaiBarGi Rd, along ThuDhammar Rd, N/Okkr Tsh	YCDC	59	
C	1	7	7	၁-၁၁	မြောက်ပိုင်းရွာအတွင်း (၈)ကွက်တွင် ၁၂၀ mm HDPE Pipe (၆၀၀၀) ဖြည့်ဆည်းပေးခြင်း၊ (၆)ကွက်တွင် ၆၃ mm HDPE Pipe (၁၃၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Laying 110 mm HDPE Pipe (2600') and 63 mm HDPE Pipe (13000') from OakKar-1 St to OakKar-8 St, Ward - C, N/Okkr Tsh	YCDC	68	
C	1	5	8	၁-၁၂	မြောက်ပိုင်းရွာအတွင်း (၆)ကွက်တွင် ၁၂၀ mm HDPE ပိုင်း (၁၆၀၀) ဖြည့်ဆည်းပေးခြင်း၊ (၃)ကွက်တွင် ၆၃ mm HDPE ပိုင်း (၄၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Laying 110 mm HDPE Pipe (1800') and 63 mm HDPE Pipe (8400') Pipe Network in Khwar Nyo-1 St and KhwarNyo-7St, Ward 12, N/Okkr Tsh	YCDC	44	
C	1	5	9	၁-၁၃	မြောက်ပိုင်းရွာအတွင်း (၆)ကွက်တွင် ၁၂၀ mm HDPE ပိုင်း (၁၆၀၀) ဖြည့်ဆည်းပေးခြင်း၊ (၁၀)ကွက်တွင် ၆၃ mm HDPE ပိုင်း (၁၃၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Laying 110 mm HDPE Pipe (2000') and 63 mm HDPE Pipe (12000') Network in Sabel-1 St and Sabel-10 St, Ward 12, N/Okkr	YCDC	61	
D	1	5	10	၁-၁၄	မြောက်ပိုင်းရွာအတွင်း (၁၁)ကွက်တွင် ၁၂၀ mm HDPE ပိုင်း (၁၆၀၀) ဖြည့်ဆည်းပေးခြင်း။	Building the fence (1800') in the ground pond, between Nayar (11) & (12) Streets, Ward (J), North Okkalapa Township.	YCDC	27	
D	1	5	11	၁-၁၅	မြောက်ပိုင်းရွာအတွင်း (၈)ကွက်တွင် မြေရိပ်ခန်းအတွက် မြှုပ်နှံခန်း (၅၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Building the fence (1200') in ground pond in Mandaing Street, Ward (B), North Okkalapa Township.	YCDC	36	
D	1	5	12	၁-၁၆	မြောက်ပိုင်းရွာအတွင်း (၆)ကွက်တွင် သူနာကျန်းမာရေးမြှုပ်နှံခန်းအတွက် မြှုပ်နှံခန်း (၅၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Building the fence (1200') in ground pond in the corner of Thudama Street & Thunandar Street, Ward (K), North Okkalapa Township.	YCDC	18	
Shwe Pauk Kan									
C	2	1	၂-၁	၁-၁၇	၁၂၀ mm HDPE 3400' ပြောင်းပေးခြင်း။	Laying 110 mm HDPE 3400' along Aung YarZarSt, Ward 12	YCDC	20	
C	2	2	၂-၂	၁-၁၈	၁၂၀ mm HDPE 1200' ပြောင်းပေးခြင်း။	Laying 110 mm HDPE 1200' along Seikkanthar St, Ward 21	YCDC	7	
C	2	3	၂-၃	၁-၁၉	၁၂၀ mm HDPE 3400' ပြောင်းပေးခြင်း။	Laying 110 mm HDPE 3400' along AungMingalar St, Ward 12	YCDC	20	
C	2	7	၂-၄	၁-၂၀	၆၃ mm HDPE Pipe 3500' အစားထိုး ပြောင်းပေးခြင်း။	Replacing 63 mm HDPE Pipe 3500' in Hanthawady Lanes of Ward 13	YCDC	20	
C	2	7	၂-၅	၁-၂၁	၁၂၀ mm HDPE Pipe 2600', 63 mm HDPE Pipe 5300' အစားထိုး ပြောင်းပေးခြင်း။	Replacing 2' PVC Pipe with 110 mm HDPE Pipe 2600', 63 mm HDPE Pipe 5300' in the lanes of Ward 14-Shwe Paukkan	YCDC	40	
D	2	1	၂-၆	၁-၂၂	၁၂၀ mm HDPE ပိုင်း (၂၀) ဖြည့်ဆည်းပေးခြင်း၊ (၄)ကွက်တွင် ၅၄'x90' မြေရိပ်ခန်းအတွက် မြှုပ်နှံခန်း (၅၄'x90') ဖြည့်ဆည်းပေးခြင်း။	Building the fence (54'x90') in pump station compound, between Hnin Si Street No. (3) & corner of Padauk Street, Ward (20), Shwe Pauk Kan Myo Thit.	YCDC	4	
D	2	1	၂-၇	၁-၂၃	(၇) ကွက်တွင် ၇၀'x60' မြေရိပ်ခန်းအတွက် မြှုပ်နှံခန်း (၇၀'x60') ဖြည့်ဆည်းပေးခြင်း။	Building the fence (70'x60') in pump station compound, between Hnin Si Street No (3) & corner of Padauk Street, Ward No.(17).	YCDC	4	
D	2	1	၂-၈	၁-၂၄	(၂) ကွက်တွင် ၁၀၂'x162' မြေရိပ်ခန်းအတွက် မြှုပ်နှံခန်း (၁၀၂'x162') ဖြည့်ဆည်းပေးခြင်း။	Building the fence (102'x162') in pump station compound, between Taung Ngu Lane (2) & corner of Bayint Naung Street, Ward No. (20).	YCDC	8	
South Okkala									
C	3	5	၃-၁	၁-၂၅	Recycle Pipe 110 mm HDPE ပိုင်း (၉၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Laying 110mmHDPE Pipe (300') and 90mmHDPE Pipe (28700') to replace Recycle pipe and remove spaghtti pipe in Ward 13, S/Okkr	YCDC	216	
C	3	1	၃-၂	၁-၂၆	၇၅ mm HDPE ပိုင်း (၇၅၀၀) ဖြည့်ဆည်းပေးခြင်း။	Laying 110mmHDPE Pipe (1600') and 75mmHDPE Pipe (7500') network in YarZarYit St and Lanes, Ward 7, S/Okkr	YCDC	47	
C	3	1	၃-၃	၁-၂၇	၇၅ mm HDPE ပိုင်း (၆၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Laying new pipe network - 75mmHDPE (6000') in Ward 8, S/Okkr	YCDC	34	
C	3	1	၃-၄	၁-၂၈	၁၆၀ mm HDPE ပိုင်း (၃၉၀၀) ဖြည့်ဆည်းပေးခြင်း၊ ၇၅ mm HDPE ပိုင်း (၂၈၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Laying new pipe network - 160mmHDPE (3900') and 75mmHDPE (28000') in Baho St and Lanes, Ward 3, S/Okkr	YCDC	177	
Thingangyun									
C	4	1	၄-၁	၁-၂၉	၁၂၀ mm HDPE ပိုင်း (၆၅၀၀) ဖြည့်ဆည်းပေးခြင်း။	Laying new pipe network of 110mmHDPE (6500') in ZaWaNa Ward, Thingangyun Tsh	YCDC	58	
C	4	7	၄-၂	၁-၃၀	၁၂၀ mm HDPE ပိုင်း (၁၅၀၀) ဖြည့်ဆည်းပေးခြင်း။	Replacing 2'PVC pipe with 110mmHDPE pipe in NgamoeYek Ward 1,2,3,4,5 in Thingangyun Tsh	YCDC	39	
D	4	1	၄-၃	၁-၃၁	၁၂၀ mm HDPE ပိုင်း (၁၅၀၀) ဖြည့်ဆည်းပေးခြင်း။	Constructing (35' x90' x10') three storey building with 6 attached rooms for staf and building the fence in Yankin Street, Lay Daunt Kan Ward, Thingangyun Township.	YCDC	250	
C	4	7	၄-၄	၁-၃၂	၁၂၀ mm HDPE ပိုင်း (၆၀၀၀) ဖြည့်ဆည်းပေးခြင်း။	Replacement of damaging 2'PVC pipe with 110mmHDPE (6200') in Ward 3, Thingangyun Tsh	YCDC	60	
C	4	7	၄-၅	၁-၃၃	၁၂၀ mm HDPE ပိုင်း (၁၅၀၀) ဖြည့်ဆည်းပေးခြင်း။	Replacement of damaging 2'PVC pipe with 110mmHDPE (12303') in Ward 2, Thingangyun Tsh	YCDC	80	
C	4	7	၄-၆	၁-၃၄	၁၂၀ mm HDPE ပိုင်း (၇၉၀၀) ဖြည့်ဆည်းပေးခြင်း။	Replacement of damaging 12'CI pipe along LayDaungKan Rd with 315mmHDPE (7900') in Thingangyun Tsh	YCDC	280	
C	4	7	၄-၇	၁-၃၅	၉၀ mm HDPE ပိုင်း (၁၈၅၄၃) ဖြည့်ဆည်းပေးခြင်း။	Replacement of damaging 2'PVC pipe with 90mmHDPE (18543') in Yangon Thit Ward, Thingangyun Tsh	YCDC	125	

D	23	5	4	၂၃-၆	မဟာဝေတမြို့နယ်၊ နေပြည်တော်-ပုသိမ်လမ်းပေါ် (သို့) မဟာဝေတမြို့နယ်၊ နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Pipe cleaning 6" CI pipe (1800') between Thien byu Road and Upper Pansodan Road), Daw Thien Tin Road, Mingalar Taung Nyunt Township.	YCDC	12	
C	23	1	5	၂၃-၇	မဟာဝေတမြို့နယ်၊ နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Laying 90mm HDPE Pipe (2500') in BaddarGone St (1,2,3,4,5,6), Kan Myauk Ward, Mingalar T/N Tsh	YCDC	16	
D	23	5	6	၂၃-၈	မဟာဝေတမြို့နယ်၊ နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Pipe Cleaning in 6" CI pipe (1300') , between U Phoe Kyar Street & Kyay Padain Street, Kan Taung Quarter, Mingalar Taung Nyunt Township.	YCDC	8	
C	23	7	7	၂၃-၉	မဟာဝေတမြို့နယ်၊ နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Laying 90mm HDPE Pipe (1300') in 108th St and 109th St, Mingalar T/N Ward, Mingalar T/N Tsh	YCDC	8	
၂၄									
D	24	1,12	1	၂၄-၁	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Constructing 12" CI Flow Meter and chamber in Yay Kyaw Road, Pazundaung Township.	YCDC	5	
D	24	1,12	2	၂၄-၂	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Constructing 12" CI Flow Meter and Chamber in Upper pazundaung road, Pazundaung township.	YCDC	5	
D	24	1,12	3	၂၄-၃	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Constructing 10" CI Flow Meter and chamber in Upper Pazundaung Road, Pazundaung township.	YCDC	3	
D	24	1,12	4	၂၄-၄	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Constructing 17" CI Flow Meter and chamber in Bogoyke Road, Pazundaung township.	YCDC	5	
D	24	5	5	၂၄-၅	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၇၀၀) မီတာခန့် အထိ အလှူအတန်း	Pipe cleaing 6" CI pipe (700') in Kwet Thit Street, No.7 Quarter, Pazundaung Township.	YCDC	5	
D	24	5	6	၂၄-၆	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၇၀၀) မီတာခန့် အထိ အလှူအတန်း	Pipe cleaning 6" CI pipe (450') in Maha Zaya Street, No.7 Quarter, Pazundaung Township.	YCDC	4	
D	24	5	7	၂၄-၇	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၇၀၀) မီတာခန့် အထိ အလှူအတန်း	Pipe cleaning 6" CI pipe (450') in Maha Thukha Street, No.7 Quarter, Pazundaung township.	YCDC	4	
D	24	5	8	၂၄-၈	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၇၀၀) မီတာခန့် အထိ အလှူအတန်း	Pipe cleaning 6" CI pipe (450') in Maung Tan Street, No.7 Quarter, Pazundaung Township.	YCDC	3	
၂၅									
D	25	2,12	1	၂၅-၁	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၃၀၀) မီတာခန့် အထိ အလှူအတန်း	Connecting 12" CR Main reinforce line (300') to 6" CR main pipe due to low pressure in Botahtaung Zay Street, Ward 4, and installing 3 HP motor in Botahtaung township.	YCDC	2	
D	25	5	2	၂၅-၂	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Pipe cleaning in 6" CI pipe (850') , Bokalay Zay Street (between Bandoala Road & Merchant Road), Ward 8, Botahtaung township.	YCDC	6	
D	25	5	3	၂၅-၃	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Pipe cleaning in 6" CI Pipe (850'), 44th Street (between Merchant Road & Kanar Road), Ward 6, Botahtaung Township.	YCDC	6	
D	25	5	4	၂၅-၄	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Pipe cleaning in 6" CI pipe (850') in 42nd Street (between Bandola Road & Kanar Road), Ward 8, Botahtaung Township.	YCDC	6	
C	25	7	5	၂၅-၅	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Repalcing 6" CI Pipe with 160mm HDPE Pipe in 42th St (bet. Merchant Rd and Strand Rd), Zay St and KamNar St, Ward 8, Botahtaung Tsh	YCDC	16	
D	25	5	6	၂၅-၆	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Installation of Flow Meter	YCDC	9	
D	25	5	7	၂၅-၇	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Installation of Flow Meter	YCDC	5	
D	25	5	8	၂၅-၈	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Installation of Flow Meter	YCDC	9	
D	25	5	9	၂၅-၉	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Installation of Flow Meter	YCDC	9	
D	25	5	10	၂၅-၁၀	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Installation of Flow Meter	YCDC	9	
D	25	5	11	၂၅-၁၁	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Installation of Flow Meter	YCDC	9	
D	25	5	12	၂၅-၁၂	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Installation of Flow Meter	YCDC	9	
D	25	5	13	၂၅-၁၃	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Installation of Flow Meter	YCDC	9	
D	25	5	14	၂၅-၁၄	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Installation of Flow Meter	YCDC	9	
D	25	5	15	၂၅-၁၅	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၈၀၀) မီတာခန့် အထိ အလှူအတန်း	Pipe line cleaning work	YCDC	7	
၂၆									
D	26		1	၂၆-၁	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Building Chain Link Fence in Thuyi/ Drinking Water Pond (200'x 200') in KaMar Ka Thwal Quarter, Dala Township.	YCDC	12	
D	26		2	၂၆-၂	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၃၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Building Chain Link Fence in Mingalar Oo (3) Drinking Water Pond (300'x250') in Yaza Thingyan Quarter, Dala Township.	YCDC	17	
D	26		3	၂၆-၃	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Building Chain Link Fence in Kan Nyi Naung No.1 Drinking Water Pond (200'x170') in Sat Myay Quarter, Dala Township.	YCDC	11	
D	26		4	၂၆-၄	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၃၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Building Chain Link Fence in No.1 Drinking Water Pond (300'x125') in Banyar Dala Quarter, Dala Township.	YCDC	13	
D	26		5	၂၆-၅	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၄၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Building Chain Link Fence in Lay Kyi Drinking Water Pond (400'x 260') in Nyaung Thone Quarter, Dala Township	YCDC	20	
D	26		6	၂၆-၆	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၄၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Building Chain Link Fence in Nat Sin Drinking Water Pond (400'x 150') in Ant Gyi West Quarter, Dala Township.	YCDC	17	
D	26		7	၂၆-၇	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၃၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Building Chain Link Fence in Yangon Pauk Pumping Station (3300').	YCDC	50	
D	26		8	၂၆-၈	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၆၀၀) မီတာခန့် အထိ အလှူအတန်း	Building Chain Link Fence in Padauk Kan Drinking Water Pond (260'x200') in Ant Gyi (East) Quarter, Dala Township.	YCDC	14	
D	26		9	၂၆-၉	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၅၀၀) မီတာခန့် အထိ အလှူအတန်း	Building Chain Link Fence in U Bo Drinking Water Pond (250'x250') in Tar Gyi Quarter, Dala Township.	YCDC	15	
D	26		10	၂၆-၁၀	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Building Chain Link Fence in Bo Ottama Drinking Water Pond (200' x180') in Hmaw Saka Quarter, Dala Township.	YCDC	11	
၂၇									
NORTH DISTRICT									
၂၈									
C	27	7	1	၂၈-၁	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Replacing 6" GI Pipe with 110 mm HDPE Pipe (1300') in Hantharwadi St, Ward 5	YCDC	12	
၂၉									
C	28	1	1	၂၉-၁	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၃၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Laying 110 mm HDPE Pipe (3500') on Baho Rd, between Than St and BuTarYone St, Hlaing Tsh	YCDC	28	
C	28	5	2	၂၉-၂	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၂၆၀၀) မီတာခန့် အထိ အလှူအတန်း	Laying new pipeline network - HDPE Pipe (26000'), Ward 16, Hlaing Tsh	YCDC	220	
C	28	1	3	၂၉-၃	မြို့နယ်အတွင်း နေပြည်တော်-ပုသိမ်လမ်းပေါ် (၃၀၀၀) မီတာခန့် အထိ အလှူအတန်း	Laying new pipeline - 110 mm HDPE Pipe (3000') from 630 mm HDPE Pipe to YadanarMon Housing, Ward 2, Hlaing Tsh	YCDC	27	

B	38	1	6	ရက်-၂-၂၀	၂၀၁၈-၂၀၁၉ ခုနှစ် နေရာ ဝတ္တရား ဆိုင် ယယ်၊ နေရာပေးအထိ ပြင်ဆင်ရေး လုပ်ဆောင်ရေး 630mm Ø HDPE Pipe (10400) ဆင်ခြင်ရေး	Laying 630mm HDPE Pipe (10400) along MyinTawThar Rd from AyarWun rd to Yamonnar Rd	YCDC	709
B	38	5	7	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repairing pipe bursts in townships of South District as emergency	YCDC	10
D	38	7	8	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Replacing valves and constructing valve chambers in the townships of South District.	YCDC	50
D	38	1	9	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Constructing stair and walk way (200') in Kokkine Service Reservoir, Bahan Township.	YCDC	20
D	38	1	10	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repairing the Steel fence and painting (1650') in the intake of Kokkine Reservoir, Bahan township.	YCDC	5
D	38	1	11	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repairing the intake of Kokkine Reservoir and painting, Bahan Township.	YCDC	5
B	38	7	12	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Laying 630mm Ø HDPE pipe (6300) along ShukhinThar Rd from Tharkayta Circle to ShukhinThar Circular Rd	YCDC	310
B	38	1	13	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Laying 630mm Ø HDPE pipe (6300) along ShukhinThar Rd from Tharkayta Circle to ShukhinThar Circular Rd	YCDC	429
B	38	1	14	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Laying 315mm Ø HDPE Pipe (5200) along No.7 Zay Rd from MyinTawThar Rd to ShukhinThar Circular Rd in Tharkayta Tsh	YCDC	286
B	38	1	15	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Laying 630mm Ø HDPE Pipe (5400) along Yamonnar Rd from PiyiDawAye rd to MinNandar Rd in Tharkayta Tsh	YCDC	368
B	38	7	16	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Replacing 16" Ø PRC Pipe beside Dala-Twanteay Rd with 400mm Ø HDPE Pipe (12000')	YCDC	691
B	38	1	17	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Laying 315mm Ø HDPE Pipe (4800) along Thumana Rd from MinNandar Rd to ShukhinThar Rd in Tharkayta Tsh	YCDC	264
B	38	1	18	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Laying 315mm Ø HDPE Pipe (4500) along ZnKaMa Rd from MinNandar Rd to ShukhinThar Rd in Tharkayta Tsh	YCDC	248
B	38	5	19	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repairing pipe bursts in townships of South District as emergency	YCDC	10
D	38	7	20	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Replacing the valves and constructing Valve Chamber in South District.	YCDC	50
B	38	5	1	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Pipe (4)		
B	38	1,7	2	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Installing and replacing new gate valves within downtown townships	YCDC	7
B	38	1,7	3	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Installing and replacing fire hydrants within downtown townships	YCDC	7
B	38	7	4	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Relocating/moving the pipe lines for road/bridge/drain construction	YCDC	25
B	38	7	5	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repairing pipelines in Strand Road Night Market	YCDC	5
B	38	1	6	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Laying 315mm Ø HDPE Pipe (2500) along Yarzardiyit Rd from NantTharPhyu st (in lower Pazundaung rd) to LinSaDaung	YCDC	138
B	38	5	7	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repairing emergency pipe bursts within downtown townships	YCDC	7
B	38	1,2	8	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Installing and replacing new gate valves within downtown townships	YCDC	7
B	38	1,2	9	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Installing and replacing fire hydrants within downtown townships	YCDC	7
B	38	1	10	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Relocating/moving the pipe lines for road/bridge/drain construction	YCDC	25
B	38	7	11	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repairing pipelines in Strand Road Night Market	YCDC	5
B	38	1	12	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Laying 315mm Ø HDPE Pipe (1500) from ThanHyatSoon St (MayYu st) to WWTP in Botahtaung Tsh	YCDC	85
B	38	5	13	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repairing emergency pipe bursts within downtown townships	YCDC	7
B	38	1,2	14	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Installing and replacing new gate valves within downtown townships	YCDC	7
B	38	1,2	16	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Installing and replacing fire hydrants within downtown townships	YCDC	7
B	38	7	17	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Relocating/moving the pipe lines for road/bridge/drain construction	YCDC	25
B	38	7	18	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repairing pipelines in Strand Road Night Market	YCDC	5
	39							
D	39	6,1	1,2,3	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Purchasing Water Meters by tender system	YCDC	825
E	39	4	4,5,6	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repaying the printing charges/fees for E-receipt to Public Relation and Information Department.	YCDC	0
E	39	4	7,8,9	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Repaying the printing charges/fees for house connection permit form to Public Relation and Information Department.	YCDC	1
	40							
E	40	9	1	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Requesting to purchase the ink for Printer & Copier.	YCDC	2
E	40	9	2	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Maintenance fees for computer & its related accessories.	YCDC	1
E	40	9	3	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Requesting to purchase stationery.	YCDC	1
D	40	9	4	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Purchasing 1 set of Multi-function Color Copier.	YCDC	1
D	40	9	5	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Purchasing Color Printer.	YCDC	1
D	40	9	6	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Purchasing office desk & computer desk.	YCDC	7
D	40	9	7	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Purchasing filing cabinets.	YCDC	1
E	40	9	8	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Requesting to purchase the ink for Printer & Copier.	YCDC	2
E	40	9	9	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Maintenance fees for computer & its related accessories.	YCDC	1
E	40	9	10	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Requesting to purchase stationery.	YCDC	1
D	40	9	11	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Purchasing Color Printer.	YCDC	1
D	40	9	12	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Purchasing office desk & computer desk.	YCDC	5
D	40	9	13	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Purchasing filing cabinets.	YCDC	0
E	40	9	14	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Requesting to purchase the ink for Printer & Copier.	YCDC	2
E	40	9	15	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Maintenance fees for computer & its related accessories.	YCDC	1
E	40	9	16	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Requesting to purchase stationery.	YCDC	1
D	40	9	17	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Purchasing office desk & computer desk.	YCDC	5
D	40	9	18	ရက်-၂-၂၀	မိမိတို့ နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး နေရာပေး	Purchasing cabinets.	YCDC	0

	41			41	လျှပ်စစ် / မက္ကဏိက	Electrical & Mechanical Section		
A	41	1	1	၄၁-၂	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ ဖွဲ့ (၇) နှင့် ဖွဲ့ (၈) ပါရှိသည့် 66KV မြေအောက် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေးနှင့် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Month Gun water supply project zone (7) and the power zone (8) 66KV power transmission line installation and theaters electrical activities.	YCDC	1200
A	41	1	2	၄၁-၃	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ Transformer မြေအောက် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Water reservoir levels Transformer power lines and high-voltage electrical appliances high-performance.	YCDC	100
A	41	1	3	၄၁-၄	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ 33/6.6KV Outdoor မြေအောက် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Swimming push water power plant 33 / 6.6KV Outdoor theaters purchasing raise voltage electrical appliances and electrical activities.	YCDC	100
A	41	1	4	၄၁-၅	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ Pump & Motor (၃) အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Aungtagun push water plant Pump and Motor (3) in exchange for new installations.	YCDC	1500
A	41	1	5	၄၁-၆	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ Pump & Motor (၄) အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Installing new Pump & Motor (4) sets in No.2 Station in Yegu pumping station.	YCDC	2000
A	41	1	6	၄၁-၇	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ 200KW Pump (၂) ခု ဖြစ်စေရန်	To use push to plant 200KW Pump (2) 0 purchase.	YCDC	550
A	41	1	7	၄၁-၈	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ 12M High Mast မီးဘီး (၄) ခု ပြန်လည်ထူထောင်ရေး	Swimming push installing expanded factory fire security lines and a pillar of fire 12M High Mast pillar (4) installation.	YCDC	20
A	41	1	8	၄၁-၉	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ (၇) နှင့် ဖွဲ့ (၈) မှ လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Month Gun water supply project zone (7) and push zone (8) 0 necessary electrical activities within the plant.	YCDC	200
A	41	1	9	၄၁-၁၀	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ Transformer မြေအောက် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Large branch, the reservoir Push plants Transformer Power lines and high-voltage electrical appliances Enhancements	YCDC	100
C	41	1	10	၄၁-၁၁	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ Transformer မြေအောက် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Pyawbwe push water plant Pump and Motor (3) in exchange for new installation	YCDC	50
A	41	1	11	၄၁-၁၂	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ Pump & Motor (၃) ခု ဖြစ်စေရန်	Township push Transformer factories, power lines and electrical equipment advanced.	YCDC	1200
A	41	1	12	၄၁-၁၃	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ (၁) နှင့် ဖွဲ့ (၉) မှ လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Rain tree water supply project in the zone (1) and the zone (9) required services.	YCDC	1000
	42			42	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ	LAGUNPYIN PROJECT		
A	42	1	1	၄၂-၁	အညွှန်းစံတံဆိပ် (Lagoon) ၈၀ x ၁၅၅ ၈၀ x ၁၅၅ ကျောက်စိမ်းအောက်တွင် အောက်ဖျားတွင်	Sediment forsaken (Lagoon) (830 ft x 155 ft x 14 ft) of rock in the floor and side walls.	YCDC	450
	42							
	42							
A	42	1	2	၄၂-၂	အညွှန်းစံတံဆိပ်တံဆိပ်တံဆိပ်တံဆိပ်တံဆိပ်တံဆိပ် ပေါက်ကွဲမှု (၁၇၇၇) အောက်တွင် အောက်ဖျားတွင်	On top of the pre-sedimentation tanks Buffel Wall water off the floor (1737) and the drainage canal (21280).	YCDC	110
	42							
	42							
A	42	1		၄၂-၃	အညွှန်းစံတံဆိပ်တံဆိပ်တံဆိပ်တံဆိပ်တံဆိပ်တံဆိပ် အောက်တွင် အောက်ဖျားတွင်	Around the top of the pre-sedimentation tanks to go in, dirt and trash Parapet Wall (2855).	YCDC	100
	42							
	42							
D	42		4	၄၂-၄	အညွှန်းစံတံဆိပ်တံဆိပ်တံဆိပ်တံဆိပ်တံဆိပ်တံဆိပ် ကျောက်စိမ်းအောက်တွင် အောက်ဖျားတွင်	Compound circuit and entry to the earth, 6 "x 9" 1 "vice large rock (800'-0" x 12'-0" x 1'-0") fields.	YCDC	32
	42							
	42							
A	42	1	5	၄၂-၅	Low Lift Pump နှင့် Dividing Well တွင် Apron & Drain ပြန်လည်ထူထောင်ရေး	Low Lift Pump and Dividing Well Apron & Drain.	YCDC	20
	42							
A	42	1	6	၄၂-၆	အညွှန်းစံတံဆိပ် Sedimentation (၄) တွင် Apron & Drain ပြန်လည်ထူထောင်ရေး	Sedimentation tanks Sedimentation (4) Apron & Drain.	YCDC	72
	42							
A	42	1	7	၄၂-၇	ရေခဲအောက် (၂) တွင် Apron & Drain တွင် ပြန်လည်ထူထောင်ရေး	Water tank (2) Apron & Drain.	YCDC	46
A	42	1	8	၄၂-၈	ရေခဲအောက် Clear Water Reservoir တွင် Apron & Drain ပြန်လည်ထူထောင်ရေး	The water in Lake Clear Water Reservoir Apron & Drain.	YCDC	20
	42							
D	42			၄၂-၉	Raw Water Intake Pumping Station ဝါးစုမိတ်ဆွဲရုံ ရေခဲအောက်တွင် ပြန်လည်ထူထောင်ရေး	Each compound of the Raw Water Intake Pumping Station brick roof drainage ditch.	YCDC	73
	42							
A	42			၄၂-၁၀	JICA ODA Loan (MY-P5) မြေအောက် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး မြေအောက် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	JICA ODA Loan (MY-P5) Project Consultant (Consultant fee), the cost of the eastern zone (7) (Dagon) and North Dagon, Zone (8) (Port) and Dagon Dagon (South) on pipelines by DMA (District Metering Area) contacting zone meter building area of water supply systems, water tanks, and related services chlorine, all the build system (Chlorination), Gun to push the water treatment plant outside plant (Pumping Station) and the building of the control room (Control Room).	ODA	62700 35750
D	42		9	၄၂-၁၁	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ အောက်ဖျားတွင် အောက်ဖျားတွင်	Month Gun compound of the Water Treatment Plant (4) (6) Construction of a housing attachment	YCDC	690
D	42		10	၄၂-၁၂	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ RC အောက်ဖျားတွင် အောက်ဖျားတွင်	Month Gun compound of the water supply project (4) (6) with RC Compound Building (1).	YCDC	899
A	42		11	၄၂-၁၃	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ JICA ODA (Loan) (MY-P5) မြေအောက် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Month Gun water supply project, and (4) Dagon Township among JICA ODA (Loan) (MY-P5) project and related services for companies, consultants and contractors to pay taxes and bank fees.	YCDC	11180
	42							
A	42		12	၄၂-၁၄	JICA ODA Loan (MY-P5) မြေအောက် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး မြေအောက် လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	JICA ODA Loan (MY-P5) project and related operations for companies, consultants and contractors to pay taxes and bank fees.	YCDC	9850
D	42		13	၄၂-၁၅	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ (၄) နှင့် (၆) အောက်ဖျားတွင် အောက်ဖျားတွင်	Month Gun Water Treatment Plant together with compound (4) (6) Construction of the housing (1).	YCDC	690
A	42	1	14	၄၂-၁၆	လျှပ်စစ် ပစ္စည်းများ ထားရှိရာ ဝါးစုမိတ်ဆွဲရုံ ဖွဲ့ (၇) နှင့် (၈) မှ လျှပ်စစ် အားပေးစနစ် ပြန်လည်ထူထောင်ရေး	Month Gun water supply project zone (7), Compound of the zone (8) to push water plant required electrical activities.	YCDC	200
	43			43	ကုက္ကိုးရွာစု ရေပေး စနစ်	Kokkwa Project		
A	43			၄၃-၁	JICA ODA Loan Project (MY-P19) တွင် JICA စေ့ငြိမ်း အဖွဲ့ဝင် (Consultant) ဖြစ်စေရန် (60 MGD) တွင် အောက်ဖျားတွင် အောက်ဖျားတွင်	JICA ODA Loan Project (MY-P19) with JICA Loan Consultant (Consultant) Rental, rain tree water purification plant building (60 MGD) and rejoin the large compressor installations, water pipelines, water supply zone (1), according to DMA (District Metering Area) zone meter building area of water supply systems, water tanks, and related services.	ODA	150669 165150
A	43		1	၄၃-၂	JICA ODA Loan Project (MY-P19) တွင် အောက်ဖျားတွင် အောက်ဖျားတွင်	JICA ODA Loan Project (MY-P19) and the kind of tree river water supply project in connection with the earth to dig the ground, and related services.	YCDC	538
A	43		2	၄၃-၃	JICA ODA Loan Project (MY-P19) တွင် အောက်ဖျားတွင် အောက်ဖျားတွင်	JICA ODA Loan Project (MY-P19) kind of tree river water supply project consultant company to pay taxes, bank fees, and project related services.	YCDC	20700
A	43		3	၄၃-၄	JICA ODA Loan Project (MY-P19) တွင် အောက်ဖျားတွင် အောက်ဖျားတွင်	JICA ODA Loan Project (MY-P19) on the water supply zone (9) meters by DMA (District Metering Area) zone in the area of water supply system construction, and related services.	YCDC	8694

C	46	5	20	၅၆-၂၉	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၁၀) ချို့ယွင်းမှုစစ်ဆေးခြင်း Function test ဖြစ်ပွားခြင်း	Existing Pipe Network Investigation	Conducting Existing Pipe Network Investigation & Function Test in No. (10) Quarter, South Okkalapa Township.	YCDC		2
C	46	5	21	၅၆-၂၈	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၁၄) ချို့ယွင်းမှုစစ်ဆေးခြင်း Function test ဖြစ်ပွားခြင်း	Existing Pipe Network Investigation	Conducting Existing Pipe Network Investigation & Function Test in No. (14) Quarter, South Okkalapa Township.	YCDC		2
E	46	9	22	၅၆-၂၅	Drawing စာရွက်စာတမ်း၊ ရုံးသုံးအခမ္မာရရှိရန်အတွက် ဝယ်ယူခြင်း		Purchasing Drawing paper & stationery.	YCDC		0
E	46	9	23	၅၆-၂၆	Computer ပုံနှိပ်စက်၊ ပုံနှိပ်စက်အစိတ်အပိုင်းအား ဝယ်ယူခြင်း		Maintenance of Computer & printer and replacing the printer ink.	YCDC		0
C	46	5	24	၅၆-၂၇	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၄) ချို့ယွင်းမှုစစ်ဆေးခြင်း DMA စနစ် Pilot Project	DMA စနစ် Pilot Project	Conducting DMA System Pilot Project in Ward No.(nga), North Okkalapa Township	YCDC		350
C	46	5	25	၅၆-၂၈	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၅) ချို့ယွင်းမှုစစ်ဆေးခြင်း DMA စနစ် Pilot Project	DMA စနစ် Pilot Project	Conducting DMA System Pilot Project in Ward No.5, South Okkalapa Township	YCDC		350
C	46	5	26	၅၆-၂၉	Leakage Detection Instrument ဝယ်ယူခြင်း		Purchasing Leakage Detection Instrument	YCDC		20
C	46	5	27	၅၆-၂၇	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၅) ချို့ယွင်းမှုစစ်ဆေးခြင်း 1st Phase JICA ODA LOAN NRW Reduction Project အား စစ်ဆေးခြင်း၊ ထိန်းသိမ်းခြင်း၊ အစိတ်အပိုင်း အစားထိုးခြင်း၊ Pump , Inlet & Outlet meter ပစ္စည်းများ ဝယ်ယူခြင်း	1st Phase JICA ODA LOAN NRW Reduction Project အား စစ်ဆေးခြင်း၊ ထိန်းသိမ်းခြင်း၊ အစိတ်အပိုင်း အစားထိုးခြင်း၊ Pump , Inlet & Outlet meter ပစ္စည်းများ ဝယ်ယူခြင်း	Monitoring/checking NRW Reduction Project done by JICA ODA Loan 1st Phase in Ward 5, Mayangone Township and repairing pump, Inlet and Outlet meters and other equipments.	YCDC		2
C	46	5	28	၅၆-၂၇	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၁၄) ချို့ယွင်းမှုစစ်ဆေးခြင်း JICA Advisor တွင် အစားထိုးခြင်း၊ NRW Reduction Project အား စစ်ဆေးခြင်း၊ ထိန်းသိမ်းခြင်း၊ အစိတ်အပိုင်း အစားထိုးခြင်း၊ Pump , Inlet & Outlet meter ပစ္စည်းများ ဝယ်ယူခြင်း	JICA Advisor တွင် အစားထိုးခြင်း၊ NRW Reduction Project အား စစ်ဆေးခြင်း၊ ထိန်းသိမ်းခြင်း၊ အစိတ်အပိုင်း အစားထိုးခြင်း၊ Pump , Inlet & Outlet meter ပစ္စည်းများ ဝယ်ယူခြင်း	Monitoring/checking NRW Reduction Project done by JICA Advisor Team in Ward 14, Yankin Township and repairing pump, Inlet and Outlet meters.	YCDC		2
C	46	5	29	၅၆-၂၅	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၇) ချို့ယွင်းမှုစစ်ဆေးခြင်း JICA Grant Aid TODA JAPAN အား စစ်ဆေးခြင်း၊ ထိန်းသိမ်းခြင်း၊ အစိတ်အပိုင်း အစားထိုးခြင်း၊ DMA Pump , Inlet & Outlet meter ပစ္စည်းများ ဝယ်ယူခြင်း	JICA Grant Aid TODA JAPAN အား စစ်ဆေးခြင်း၊ ထိန်းသိမ်းခြင်း၊ အစိတ်အပိုင်း အစားထိုးခြင်း၊ DMA Pump , Inlet & Outlet meter ပစ္စည်းများ ဝယ်ယူခြင်း	Monitoring/checking DMA Project done by JICA Grand Aid Program (TODA Japan) in No.2,3 and 4 Wards in Yankin township and checking and repairing the pump, Inlet & Outlet meters.	YCDC		2
C	46	5	30	၅၆-၂၇	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၁၄) ချို့ယွင်းမှုစစ်ဆေးခြင်း Mitsubishi & Manila Water တို့မှ DMA စနစ်များ အစားထိုးခြင်း၊ NRW Reduction Pilot Project အား စစ်ဆေးခြင်း၊ ထိန်းသိမ်းခြင်း၊ အစိတ်အပိုင်း အစားထိုးခြင်း၊ Pump , Inlet & Outlet meter ပစ္စည်းများ ဝယ်ယူခြင်း	Mitsubishi & Manila Water တို့မှ DMA စနစ်များ အစားထိုးခြင်း၊ NRW Reduction Pilot Project အား စစ်ဆေးခြင်း၊ ထိန်းသိမ်းခြင်း၊ အစိတ်အပိုင်း အစားထိုးခြင်း၊ Pump , Inlet & Outlet meter ပစ္စည်းများ ဝယ်ယူခြင်း	Monitoring/checking DMA System NRW Reduction Pilot Project done by Mitsubishi & Manila Water in Hlan Pin Kone Quarter, Insein Township & checking and repairing the pump, inlet & outlet meters and network.	YCDC		2
C	46	5	31	၅၆-၂၇	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၁၄) ချို့ယွင်းမှုစစ်ဆေးခြင်း Mitsubishi & Manila Water တို့မှ DMA စနစ်များ အစားထိုးခြင်း၊ NRW Reduction Pilot Project အား စစ်ဆေးခြင်း၊ ထိန်းသိမ်းခြင်း၊ အစိတ်အပိုင်း အစားထိုးခြင်း၊ Pump , Inlet & Outlet meter ပစ္စည်းများ ဝယ်ယူခြင်း	Mitsubishi & Manila Water တို့မှ DMA စနစ်များ အစားထိုးခြင်း၊ NRW Reduction Pilot Project အား စစ်ဆေးခြင်း၊ ထိန်းသိမ်းခြင်း၊ အစိတ်အပိုင်း အစားထိုးခြင်း၊ Pump , Inlet & Outlet meter ပစ္စည်းများ ဝယ်ယူခြင်း	Monitoring/checking DMA System NRW Reduction Pilot Project done by Mitsubishi & Manila Water in No. (14/1) Quarter, South Okkalapa Township & checking and repairing the pump, inlet & outlet meters and network.	YCDC		2
C	46	5	32	၅၆-၂၅	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၆) ချို့ယွင်းမှုစစ်ဆေးခြင်း Function test ဖြစ်ပွားခြင်း	Existing Pipe Network Investigation	Conducting Existing Pipe Network Investigation & Function Test in No. (6) Quarter, South Okkalapa Township.	YCDC		2
C	46	5	33	၅၆-၂၆	၀-တော့ကွဲလွဲမှုစစ်ဆေးခြင်း နမူနာ (၇) ချို့ယွင်းမှုစစ်ဆေးခြင်း Function test ဖြစ်ပွားခြင်း	Existing Pipe Network Investigation	Conducting Existing Pipe Network Investigation & Function Test in No. (2) Quarter, North Okkalapa Township.	YCDC		2
E	46	9	34	၅၆-၂၅	Drawing စာရွက်စာတမ်း၊ ရုံးသုံးအခမ္မာရရှိရန်အတွက် ဝယ်ယူခြင်း		Purchasing Drawing paper & stationery.	YCDC		0
E	46	9	35	၅၆-၂၆	Computer ပုံနှိပ်စက်၊ ပုံနှိပ်စက်အစိတ်အပိုင်းအား ဝယ်ယူခြင်း		Maintenance of Computer & printer and replacing the printer ink.	YCDC		0
	47			47	Computer Section		Computer Section			
E	47	4	1	၅၇-၁	New Customer Database Program ဝယ်ယူခြင်း		Drafting New Customer Database Program.	YCDC		55
E	47	4	2	၅၇-၂	Customer data migration in all T/S ဝယ်ယူခြင်း		Conducting Outomer Data Migration in All T/S	YCDC		50
E	47	4	3	၅၇-၃	Meter reading management(မှူး) ဝယ်ယူခြင်း၊ Yapa-1 New Billing & Collection Function New connections, Customer Detail Database Function Tariff collection management, Yapa-2,4 ဝယ်ယူခြင်း		Meter Reading Management (Yapa-1 New Billing & Collection Function, New connections, customer detail data search function)	YCDC		20
E	47	4	4	၅၇-၄			Tariff collection management, Yapa-2,4 ဝယ်ယူခြင်း	YCDC		70
	48			48	Water Quality		Water Quality			
D	48	2	1	၅၈-၁	Glass Fiber Filter နှင့် ဆက်စပ်ပစ္စည်းများ		Glass Fiber Filter and related materials	YCDC		2
D	48	2	2	၅၈-၂	Arsenic Test Kit		Arsenic Test Kit	YCDC		1
D	48	2	3	၅၈-၃	ဒါမိုက်ဂျစ်တီယမ်စစ်ဆေးရန် မိကျာရည်		Chemical for Leak Track	YCDC		13
D	48	2	4	၅၈-၄	ဗေလျာတိုက်စီမံကိန်းပစ္စည်းစစ်ဆေးရန်		Equipment to measure the bacteria in water	YCDC		5
D	48	2	5	၅၈-၅	ဒါမိုက်ဂျစ်တီယမ်စစ်ဆေးရန် မိကျာရည်		Chemical to measure Iron concentration	YCDC		3
D	48	2	6	၅၈-၆	ဗေလျာ Manganese ပါဝင်မှုစစ်ဆေးရန် မိကျာရည်		Chemical to measure Manganese concentration in water	YCDC		2
D	48	2	7	၅၈-၇	ဗေလျာ Ammonia ပါဝင်မှုစစ်ဆေးရန် မိကျာရည်		Chemical to measure Ammonia concentration in water	YCDC		3
D	48	2	8	၅၈-၈	ဗေလျာ Sulfate ပါဝင်မှုစစ်ဆေးရန် မိကျာရည်		Chemical to measure Sulfate concentration in water	YCDC		1
D	48	2	9	၅၈-၉	ဗေလျာ Nitrate ပါဝင်မှုစစ်ဆေးရန် မိကျာရည်		Chemical to measure Nitrate concentration in water	YCDC		2
D	48	2	10	၅၈-၁၀	ဗေလျာ Nitrite ပါဝင်မှုစစ်ဆေးရန် မိကျာရည်		Chemical to measure Nitrite concentration in water	YCDC		1
D	48	2	11	၅၈-၁၁	ဗေလျာ Phosphate ပါဝင်မှုစစ်ဆေးရန် မိကျာရည်		Chemical to measure Phosphate concentration in Water	YCDC		1
D	48	2	12	၅၈-၁၂	ဗေလျာ Zinc ပါဝင်မှုစစ်ဆေးရန် မိကျာရည်		Chemical to measure Zinc concentration in water	YCDC		2
D	48	2	13	၅၈-၁၃	ဒါမိုက်ဂျစ်တီယမ်စစ်ဆေးရန် လိုက်စာပစ္စည်း (Lead Track)		Leak Test Kit	YCDC		6
D	48	2	14	၅၈-၁၄	Colour Meter Validation Liquid		Colour Meter Validation Liquid	YCDC		0
D	48	2	15	၅၈-၁၅	Mettler Toledo Calibration Liquid		Mettler Toledo Calibration Liquid	YCDC		3
D	48	2	16	၅၈-၁၆	မိကျာရည်များ		Chemical materials for the lab	YCDC		8
D	48	2	17	၅၈-၁၇	HANNA Turbidity Standard Solution		HANNA Turbidity Standard Solution	YCDC		3
D	48	2	18	၅၈-၁၈	AAS		AAS	YCDC		150
D	48	2	19	၅၈-၁၉	Chemical Storage Refrigerator		Chemical Storage Refrigerator	YCDC		10
D	48	2	20	၅၈-၂၀	မိကျာရည်များ Glass Wares ဖြစ်ပွားခြင်း		Purchasing Glass Wares for lab	YCDC		15
D	48	2	21	၅၈-၂၁	မိကျာရည်များ မိကျာရည်များ ဖြစ်ပွားခြင်း		Purchasing Chemical materials for the lab	YCDC		13
D	48	2	22	၅၈-၂၂	ဗီယိုလောဂျီစစ်ဆေးရန် မိကျာရည်များ ဖြစ်ပွားခြင်း		Purchasing Chemical for the measurement of biological	YCDC		15
D	48	2	23	၅၈-၂၃	မိကျာရည်များ HACH Reagents ဖြစ်ပွားခြင်း		Purchasing HACH Reagents for lab	YCDC		70

D	48	2	24	၄၈-၂၄	မိတ်ချိန်လုံး AAS၏ ဆက်စပ်ပစ္စည်း ဖြစ်သည့်	Purchasing AAS and its related chemical items for lab	YCDC	70
D	48	2	25	၄၈-၂၅	မိတ်ချိန်လုံးအတွက် နိုက်ထရိတ် ပါဝင်ပစ္စည်း	Measuring the involvement of Arsenic in the water	YCDC	1
D	48	2	26	၄၈-၂၆	pH (X series) and Slirrer	pH (X series) and Slirrer	YCDC	20
D	48	2	27	၄၈-၂၇	Automatic Titrator	Automatic Titrator	YCDC	60
D	48	2	28	၄၈-၂၈	Mili - DI Water Purification Systems	Mili - DI Water Purification Systems	YCDC	20
D	48	2	29	၄၈-၂၉	Quantofix Relax Test Strip Reader	Quantofix Relax Test Strip Reader	YCDC	3
D	48	2	30	၄၈-၃၀	Jar Tester	Jar Tester	YCDC	20
D	48	2	31	၄၈-၃၁	Water Bath	Water Bath	YCDC	7
D	48	2	32	၄၈-၃၂	TOC Analyzer	TOC Analyzer	YCDC	60
D	48	2	33	၄၈-၃၃	Colorimeter (Bench Top)	Colorimeter (Bench Top)	YCDC	60
D	48	2	34	၄၈-၃၄	Turbidity meter (Bench Top)	Turbidity meter (Bench Top)	YCDC	40
D	48	2	35	၄၈-၃၅	မိတ်ချိန်လုံး Glass Wares ဖြစ်သည့်	Purchasing Glass Wares for lab	YCDC	15
D	48	2	36	၄၈-၃၆	မိတ်ချိန်လုံး မိတ်ချိန်လုံး	Purchasing Chemical for the lab	YCDC	13
D	48	2	37	၄၈-၃၇	မိတ်ချိန်လုံးအတွက် မိတ်ချိန်လုံး	Purchasing Chemical materials for the measurement of Biological	YCDC	15
D	48	2	38	၄၈-၃၈	မိတ်ချိန်လုံး HACH Reagents ဖြစ်သည့်	Purchasing HACH Reagents for lab	YCDC	70
D	48	2	39	၄၈-၃၉	မိတ်ချိန်လုံး AAS၏ ဆက်စပ်ပစ္စည်း ဖြစ်သည့်	Purchasing AAS and its related chemical items for lab	YCDC	70
D	48	2	40	၄၈-၄၀	မိတ်ချိန်လုံးအတွက် နိုက်ထရိတ် ပါဝင်ပစ္စည်း	Measuring the involvement of Arsenic in the water	YCDC	1
D	48	2	41	၄၈-၄၁	Auto Clave	Auto Clave	YCDC	20
D	48	2	42	၄၈-၄၂	Fume Hood	Fume Hood	YCDC	17
D	48	2	43	၄၈-၄၃	Incubator	Incubator	YCDC	5
D	48	2	44	၄၈-၄၄	Sample Storage Refrigerator	Sample Storage Refrigerator	YCDC	15
D	48	2	45	၄၈-၄၅	Chemical Storage Refrigerator	Chemical Storage Refrigerator	YCDC	15
D	48	2	46	၄၈-၄၆	GC-MS	GC-MS	YCDC	200
D	48	2	47	၄၈-၄၇	Oven (အခြောက်ခန်း)	Oven	YCDC	15
D	48	2	48	၄၈-၄၈	Furnace (ပြုပြင်ဆင်ခြင်ဆိုင်ရာ)	Furnace	YCDC	15
	49		49		Finance	Finance		
	50		50		GIS Section	GIS Section		
	51		51		Admin	Admin		
	52		52		AID+ ဝန်ဆောင်မှု	AID+ Main Store		
	53		53		အစိုးရ ဝန်ဆောင်မှု	Sanitation		
C	53		1	၄၉-၁	မိတ်ချိန်လုံး (၄) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ Level Control System ဖြင့် Level Control & Compressor System အား ထိန်းချုပ်ခြင်း	Upgrading 24 ejectors by replacing the necessary parts, and replacing & installing Level Control System & Level Control & Compressor System.	YCDC	208
C	53		2	၄၉-၂	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Purchasing Waste Water Treatment Laboratory Equipment & related accessories.	YCDC	70
C	53		4	၄၉-၃	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Installing manhole cover/lid, constructing the damaged parts in the rear paths of 6 townships in downtown.	YCDC	60
C	53		5	၄၉-၄	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Installing manhole cover/lid, constructing the damaged parts in the main roads of 6 townships in downtown area.	YCDC	60
C	53		6	၄၉-၅	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Replacing Air Pipes, Exhaust pipes.	YCDC	5
C	53		7	၄၉-၆	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Connecting Over Head Electrical line in Main Air Compressor Compound, Botahtaung Township.	YCDC	50
C	53		8	၄၉-၇	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Replacing manholes, sewage pipelines in rear paths of No.1 Air compressor area, Landamadaw Township.	YCDC	1500
C	53		9	၄၉-၈	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Replacing sewage pipe and manhole in 3 rear paths of No.28 Ejector Area, Botahtaung Township.	YCDC	1500
C	53		10	၄၉-၉	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Purchasing the necessary items for sewage disposal works.	YCDC	50
C	53		11	၄၉-၁၀	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Constructing (36x30') (2) buildings with 4 rooms in Waste Water Treatment Plant, Botahtaung Township.	YCDC	40
C	53		12	၄၉-၁၁	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Constructing (36x30') building with 4 rooms in Ahlon Township.	YCDC	20
C	53		13	၄၉-၁၂	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Purchasing the necessary items for sewage disposal works.	YCDC	50
C	53		14	၄၉-၁၃	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Purchasing the Laboratory equipment to use in Waste Water Treatment Laboratory, Botahtaung Township.	YCDC	30
C	53		15	၄၉-၁၄	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Major maintenance work of 200 HP electric compressor (1) & 120 HP electric compressor (1) in Main Air Compressor, Botahtaung Township.	YCDC	18
C	53			၄၉-၁၅	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Purchasing 18" Ø Air gate valve (4) nos in Main Air Compressor, Botahtaung Township.	YCDC	10
C	53			၄၉-၁၆	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Constructing 1 Over Head Crane in No.10 Street Air Compressor, Lanmadaw Township.	YCDC	70
C	53			၄၉-၁၇	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Purchasing Section & Delivery Valves (44) nos for Main Air Compressor in Botahtaung Township & No.10 Street Air Compressor.	YCDC	10
C	53		16	၄၉-၁၈	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Constructing Sludge Treatment System for Waste Water Treatment Plant near Aung Zaya Bridge, Insein Township.	YCDC	3500
C	53		17	၄၉-၁၉	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Operation & Maintenance of Waste Water Treatment Plant near Aung Zaya Bridge, Insein Township.	YCDC	681
C	53			၄၉-၂၀	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Replacing the necessary items/parts in (20) ejectors in 6 townships in downtown & Level Control System & Level Control & Compressor System.	YCDC	173
C	53			၄၉-၂၁	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Installing man hole cover/lid in rear paths of 6 townships in downtown & replacing damaged parts.	YCDC	60
C	53			၄၉-၂၂	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Installing man hole cover/lid & replacing damaged parts in main roads of downtown 6 townships.	YCDC	60
C	53			၄၉-၂၃	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Replacing Air pipes, exhaust pipes.	YCDC	10
C	53		18	၄၉-၂၄	မိတ်ချိန်လုံး (၆) လုံး အားလုံး ပြန်လည်ထိန်းသိမ်းရေးအတွက် မိတ်ချိန်လုံးအား အစားထိုးခြင်း၊ အစားထိုးပစ္စည်းများ ဝယ်ယူခြင်း	Major maintenance of 200 HP electric compressor in No.10 Street Air Compressor, Lanmadaw Township.	YCDC	10

C	53		19	၂၀၂၀	အထူးအရေးကြီးသော အစားအပိုင်း ဝယ်ယူခြင်း Air Valve ၄" (6) ခု ဝယ်ယူခြင်း	Safety	Purchasing Safety Air Valves 4" (6) nos for Main Air Compressor & No.10 Street Air Compressor.	YCDC	30
C	53		20	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း Main Air Compressor & No.10 Air Compressor		Purchasing the spare parts for Main Air Compressor & No.10 Air Compressor, Botahtaung Township.	YCDC	60
C	53		21	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း Manhole မီး အသံစွဲရာများ	(၃) ခု ဝယ်ယူခြင်း	Replacing the sewage pipes and manholes in 3 rear paths in No.1 Ejector Area, Lanmadaw Township.	YCDC	2000
C	53		22	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း Manhole မီး အသံစွဲရာများ	(၂) ခု ဝယ်ယူခြင်း	Replacing man hole and installing compressor in 2 rear paths in NO.29 Ejector Area, Pazundaung Township.	YCDC	2000
C	53			၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း အစားအပိုင်း		Purchasing necessary items for sewage disposal work.	YCDC	50
C	53		23	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း အစားအပိုင်း		Electrical works in Waste Water Treatment Plant, Botahtaung Township.	YCDC	30
C	53		24	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း Pump အစားအပိုင်း		Replacing new pumps in Waste Water Treatment Plant, Botahtaung Township.	YCDC	20
C	53		25	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း Chemical အစားအပိုင်း		Purchasing chemical agents to use in waste water treatment laboratory, Botahtaung Township.	YCDC	20
C	53		26	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း အစားအပိုင်း		Purchasing laboratory equipment for Waste Water Treatment Laboratory, Botahtaung Township.	YCDC	30
C	53		27	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း 200HP နှင့် 120HP အစားအပိုင်း	(၁) ခု ဝယ်ယူခြင်း	Major maintenance of 200 HP Electric compressor & 120 HP Electric Compressor in Main Air Compressor, Botahtaung Township.	YCDC	18
C	53		28	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း Air gate valve	၁၈ ခု ဝယ်ယူခြင်း	Purchasing 18" Ø Air Gate Valve (4) nos for Main Air Compressor in Botahtaung Township.	YCDC	10
C	53		29	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း အစားအပိုင်း		Purchasing the maintenance facilities for Main Air Compressor & No.10 Air Compressor.	YCDC	50
C	53		30	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း Section and Delivery Valve	၄၄ ခု ဝယ်ယူခြင်း	Purchasing Section & Delivery Valves (44) nos for Main Air Compressor & No.10 Air Compressor.	YCDC	10
C	53		31	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း Maintenance		Operation & Maintenance of Waste Water Treatment Plant near Aung Zaya Bridge, Insein Township.	YCDC	681
C	53		32	၂၀၂၀	အစားအပိုင်း ဝယ်ယူခြင်း Operation and Maintenance		Operation & Maintenance of Waste Water Treatment System which is on the right side of Waste Water Treatment Plant, Botahtaung Township.	YCDC	341
	54								
	54								
E	54		1	၂၀၂၀	SS Seminar ဝယ်ယူခြင်း	(၂) ခု ဝယ်ယူခြင်း	Conducting SS Seminar & awarding ceremony. (2 times)	YCDC	1
E	54		2	၂၀၂၀	SS Honorarium ဝယ်ယူခြင်း	(၂) ခု ဝယ်ယူခြင်း	SS Honorarium fees (2 times)	YCDC	1
E	54		3	၂၀၂၀	SC-3 - မိတ်ကပ်စက်	(၁) ခု ဝယ်ယူခြင်း	Purchasing SC-3 Copier 1 set	YCDC	1
E	54		4	၂၀၂၀	SC-3 - Ink		Purchasing SC-3-Ink	YCDC	1
E	54		5	၂၀၂၀	WG-3(1) - Computer(Destop)	(၁) ခု ဝယ်ယူခြင်း	Purchasing WG-3(1) Computer (desktop) 1 set	YCDC	1
E	54		6	၂၀၂၀	WG-3(1) - Color Printer	(၁) ခု ဝယ်ယူခြင်း	Purchasing WG-3(1) Color Printer (1) set	YCDC	1
E	54		7	၂၀၂၀	WG-3(1) - Ink + Cartridge		Purchasing WG-3(1) Ink+ Cartridge	YCDC	1
E	54		8	၂၀၂၀	SS Seminar ဝယ်ယူခြင်း	(၂) ခု ဝယ်ယူခြင်း	SS Seminar & awarding ceremony. (2 times)	YCDC	1
E	54		9	၂၀၂၀	SS Honorarium ဝယ်ယူခြင်း	(၂) ခု ဝယ်ယူခြင်း	SS Honorarium Fees (2 times)	YCDC	1
E	54		10	၂၀၂၀	SC-3 - Ink		SC-3 Maintenance fees & Purchasing Ink	YCDC	1
E	54		11	၂၀၂၀	WG-3(1) - Ink + Cartridge		Purchasing WG-3(1) Ink+ Cartridge and maintenance fees	YCDC	1
E	54		12	၂၀၂၀	SS Seminar ဝယ်ယူခြင်း	(၂) ခု ဝယ်ယူခြင်း	SS seminar & awarding ceremony (2 times)	YCDC	1
E	54		13	၂၀၂၀	SS Honorarium ဝယ်ယူခြင်း	(၂) ခု ဝယ်ယူခြင်း	SS Honorarium Fees (2 times)	YCDC	1
E	54		14	၂၀၂၀	SC-3 - Ink		SC-3 Maintenance fees + Purchasing Ink	YCDC	1
E	54		15	၂၀၂၀	WG-3(1) - Ink + Cartridge		WG-3(1) Purchasing Ink + Cartridge and maintenance fees	YCDC	1

Annex-3.D: Human Resource Development Plan (Draft)

THE PROJECT FOR IMPROVEMENT OF
WATER SUPPLY MANAGEMENT OF YCDC

Human Resource Development Plan (draft)

October 2019

HRD Team

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Chapter 1 Vision of HRD

1.1 Vision of HRD

1.1.1 Vision of YCDC

To serve all Yangon Citizens from their birth to the end of lives.

1.1.2 Mission of EDWS

Committee shall manage to supply the clean and purified water sufficiently inside the city territory for the people for drinking.

1.1.3 Vision of HRD of EDWS

- a) HRD to realize YCDC Mission.
- b) HRD to support sustainable water supply & sewage business
- c) To develop basic abilities to implement EDWS works, acquire specific knowledge & technology for rapid expansion, and enable to adopt new technology to solve problems.
- d) HRD to exploit full potential of each staff
- e) HRD suitable to each role and level of the staff
- f) HRD aiming at customer's satisfaction

The sustainable HRD has been clarified as “Ideal future image of EDWS” in 2015 as shown in the figure below

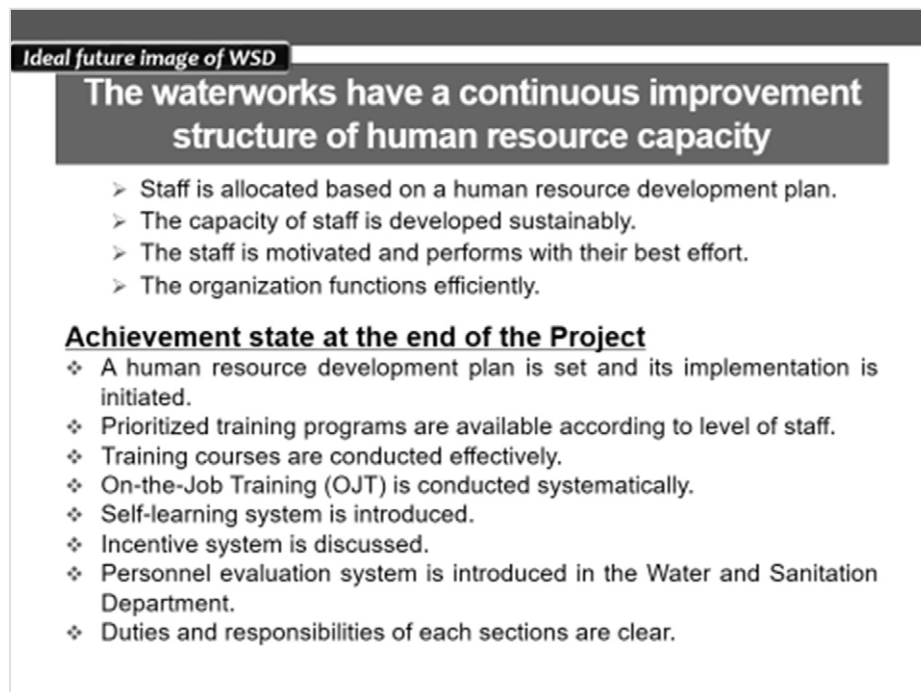


Figure 1-1: Ideal Future Image of EDWS

1.2 Ideal staff of EDWS

- a) Having sense of responsibility
- b) Thinking and acting independently

- c) Working to gain customers' trust
- d) Having necessary knowledge and skills and continuing learning with broader view
- e) Having business mind and considering cost benefit

1.3 Scope of HRD Plan

Objectives of HRD Plan is as follows:

- To show clear directions of HRD measures from longer term of view so that EDWS can realize its mission and vision. (10 years ahead)
- To secure the sustainable system for HRD including empowering trainers, assistants and HRD staff both in quantity and quality.

To realize vision, the following HRD activities shall be prioritized in the fields of:

- Training
- OJT
- Self- learning
- Rising motivation of individual staff
- Performance appraisal

In addition, the resources of HRD shall be strengthened through:

- Empowering HRD section
- Bringing up trainers/instructors
- Establishment of Training Center

Chapter 2 Current situation of HR

2.1 Organization of EDWS (staff number and offices)

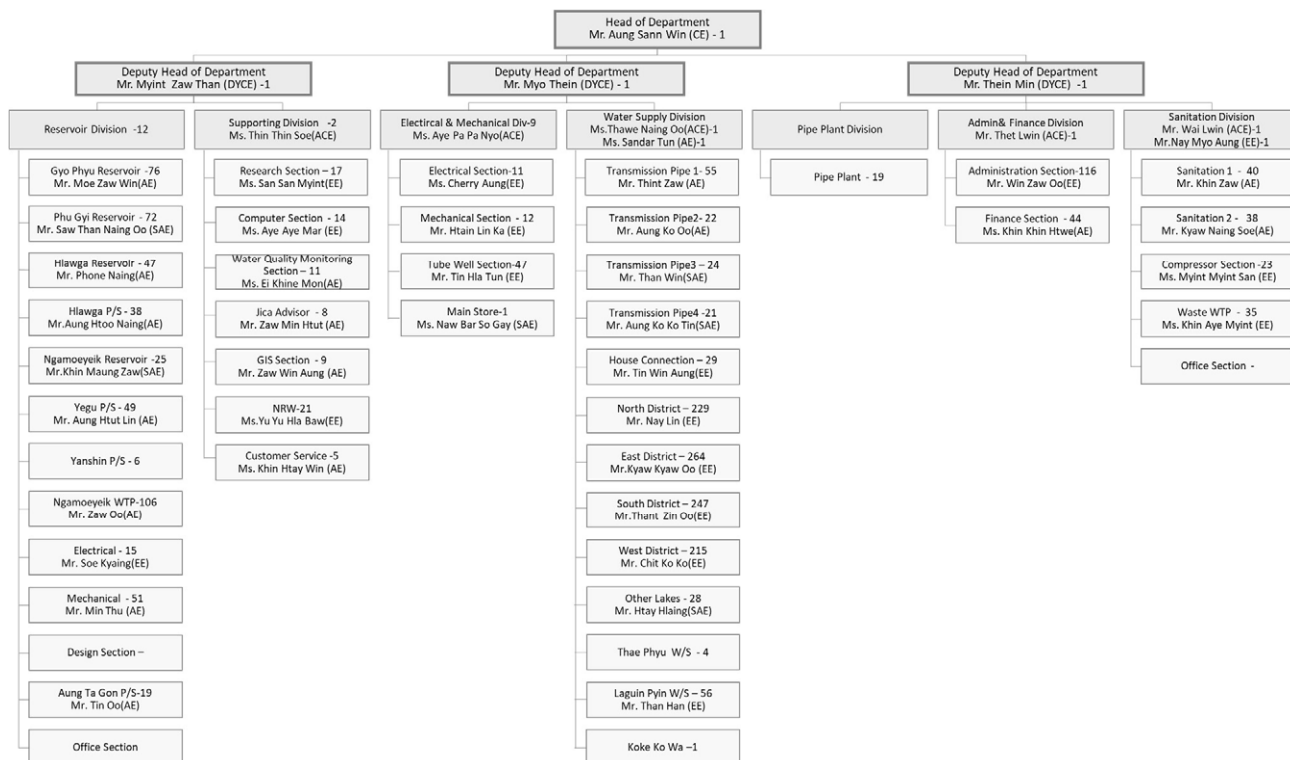


Figure 2-1: Organization chart of EDWS (as of 31/01/2019)

2.2 Profiles of Staff

2.2.1 Age

The table and graph below show the staff number and average age of permanent staff and non-permanent staff in 2016 and 2019 by each staff category of EDWS. The data of 2019 includes only staff in Water Resources and Water Supply Authority after separation of sanitation related offices.

Table 2-1: Staff number and Average Age by staff category

	Staff Number		Average Age	
	2016	2019	2016	2019
Permanent Staff	1116	821	45.4	48.7
Engineers	236	179	40.9	45.3
Officers & Clerks	359	356	48.0	51.8
Accountant	24	19	48.2	50.2
Technicians & labors	497	267	45.6	46.7
Non-Permanent Staff	1034	1101	33.1	34.7
Flat	102	268	30.2	32.3
Daily Wages	88	359	50.2	41.7
WA	844	474	31.7	30.7
Total	2150	1922	39.5	40.7

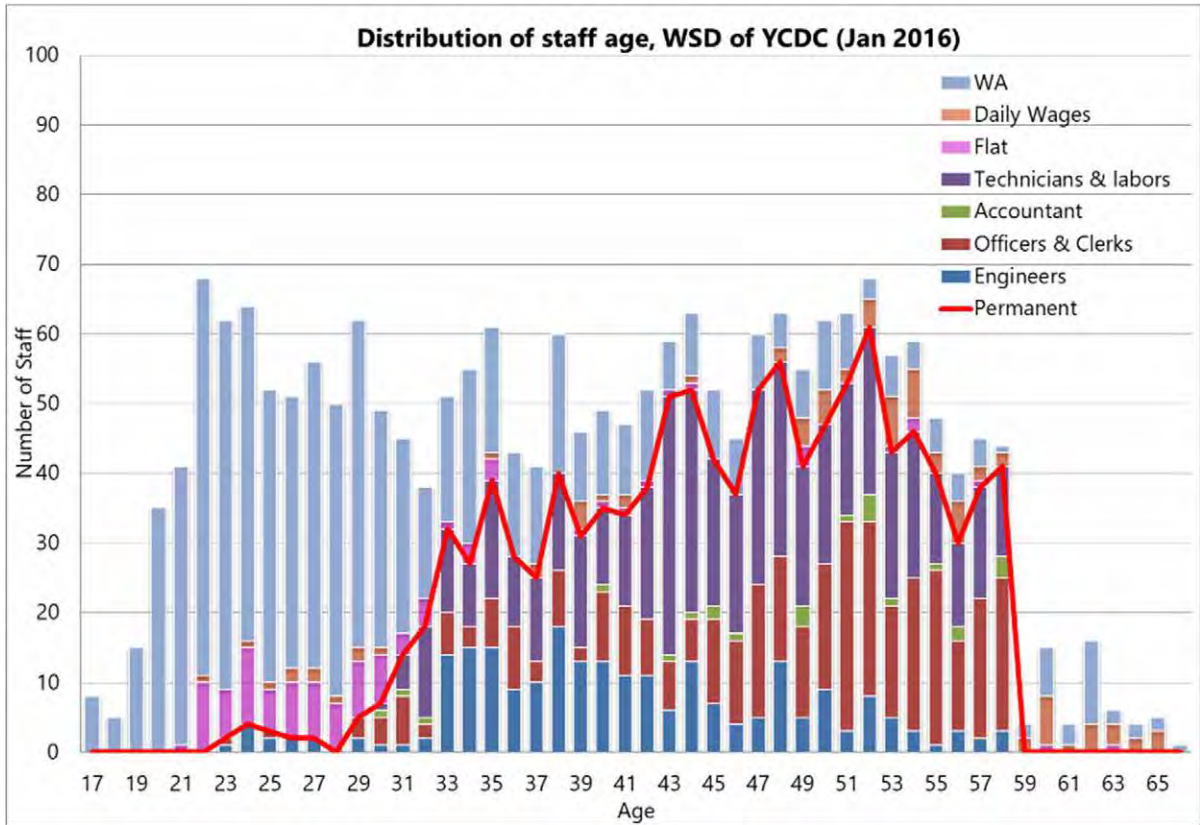


Figure 2-2: Staff Age Distribution by Staff Category (as of January 2016)

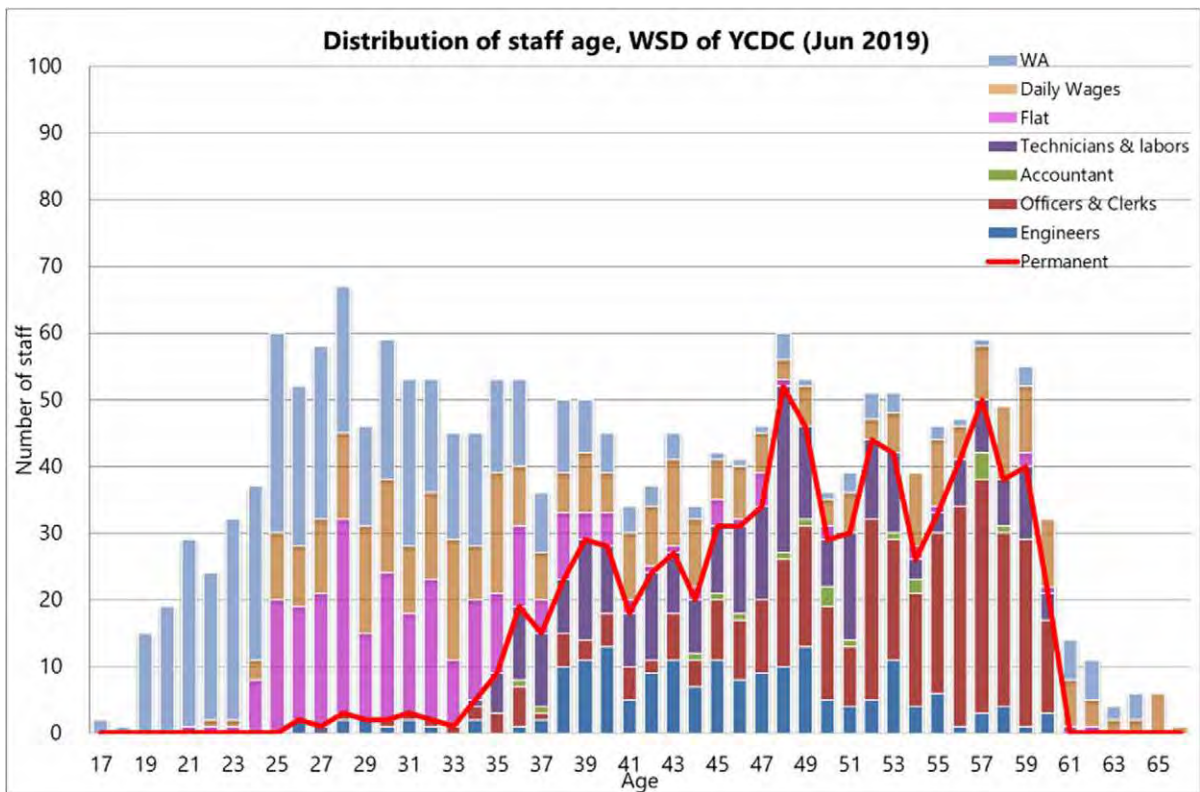


Figure 2-3: Staff Age Distribution by Staff Category (as of June 2019)

[Findings]

- The large number of Technicians & Labors declines in 2019.
- The employment age as permanent staff was shifted from around 30 years old to 35 years old.
- The number of non-permanent are larger amount in 2019.
- Many younger engineers left an office.
- A number of WA in 2016 was promoted to Flat & Daily Wages and still remain as non-permanent staff.

The issues listed above are mainly because EDWS has no authority to recruit the staff for the department as needed.

- ✓ Most Accountant & Clerk are going to retire in 2019 and sooner.

Lack of specialists in each field for the future

[Issues]

From the long-term HRD view, this situation may have serious impact as follows;

- ✓ Miss occasions to bring up younger generation
In staff age of early 20's, late 20's, 30's, 40's, 50's, the expected capacity, and performance will vary. Currently, the only permanent staff can have a responsible role for their duties. At their late 30's, as promoting to permanent staff, staff is firstly assigned for responsible work. It is difficult to accumulate experiences and expertise, and implement accumulative HRD.
- ✓ Aging organization will be in serious lack of HR in future.
In particular, EDWS plans to expand its business rapidly. It is crucial to secure core capacity for future HR as top management or managers.

This situation has been worsen during the last three years. If this situation lasts longer, EDWS will be critically weakened of its institution. The table and figure below are the projection in 10 years with assumption of lasting the current situation.

Table 2-2: Projected Staff Number in 2028

	Staff Number			Average Age		
	2016	2019	2028 (projected)	2016	2019	2028 (projected)
Permanent Staff	1116	821	528	45.4	48.7	51.5
Engineers	236	179	136	40.9	45.3	51.7
Officers & Clerks	359	356	126	48	51.8	53.8
Accountant	24	19	11	48.2	50.2	55.0
Technicians & labors	497	267	254	45.6	46.7	50.0
Non-Permanent Staff	1034	1101	1763	33.1	34.7	31.9
Flat	102	268	-	30.2	32.3	-
Daily Wages	88	359	-	50.2	41.7	-
WA	844	474	-	31.7	30.7	-
Total	2150	1922	2290	39.5	40.7	36.4

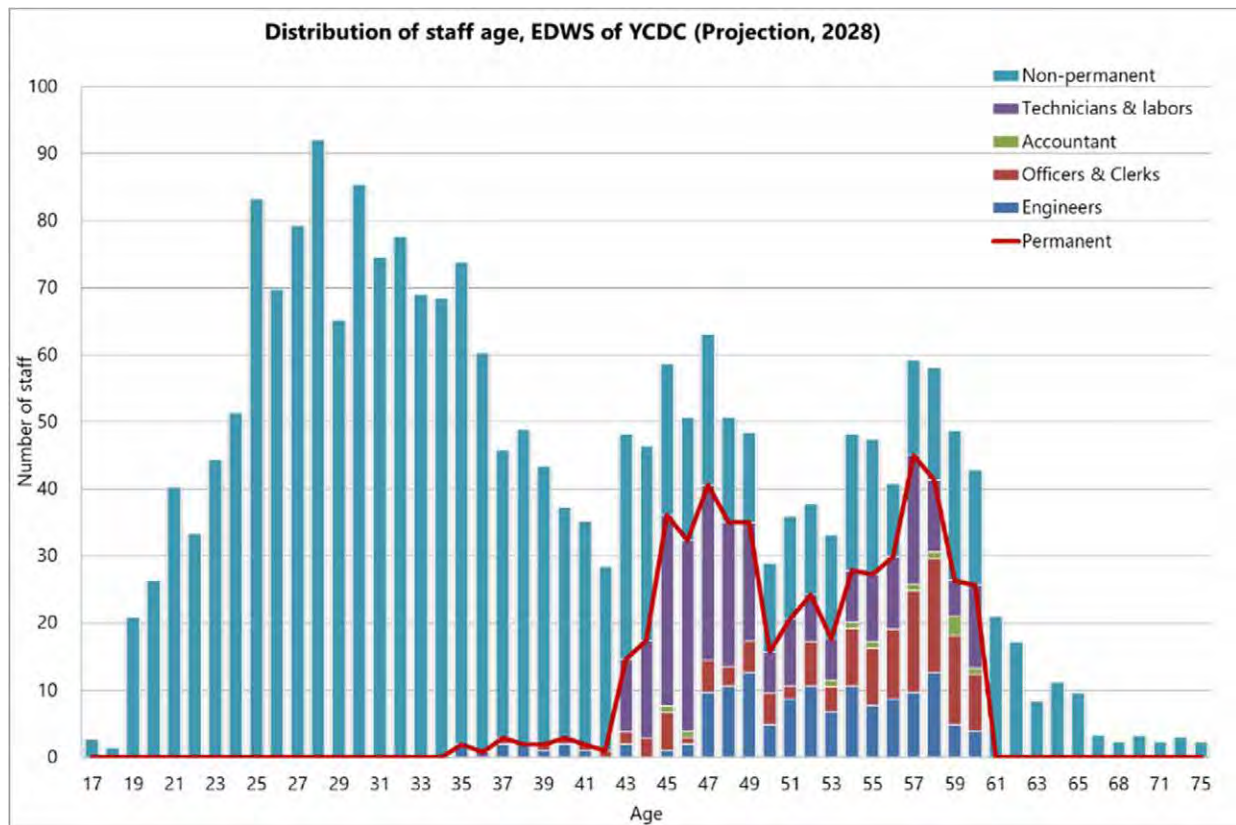


Figure 2-4: Staff Age Distribution by Staff Category (Year 2028, projected)

[Assumptions for the projection]

- Turnover rate: average value in last 3 years. 2.6 % excluding retirement for permanent staff, and 14.2 % for non-permanent staff.
- Employment of permanent staff: average value in last 4 years. 10 persons per year with a age range from 34 to 41.
- Employment of non-permanent staff: new employment is up to 35 years old. The number of non-permanent staff is calculated to fill the gap between permanent staff and the total staff number.

In the following chapters, it is necessary to take this points into consideration of proposing measures for HRD.

2.2.2 Staff level

Table 2-3: Staff number and composition ratio by staff level

	Assigned	Jan 2017	Jan-2018	Jan-2019	Aug-2019
ACE and upper	9 (0.4%)	9 (0.4%)	9 (0.4%)	7 (0.3%)	6 (0.3%)
EE level	23 (0.9%)	20 (0.9%)	23 (1.0%)	22 (1.0%)	19 (1.0%)
AE level	56 (2.3%)	54 (2.5%)	50 (2.2%)	55 (2.4%)	43 (2.2%)
Supervisor level	70 (2.9%)	68 (3.1%)	60 (2.7%)	66 (2.9%)	42 (2.2%)
SAE level	219 (9.0%)	204 (9.4%)	195 (8.7%)	213 (9.4%)	159 (8.2%)
Staff level	2048 (84.5%)	710 (32.7%)	685 (30.7%)	636 (28.2%)	559 (28.7%)
Non-Permanent	0 (0.0%)	1108 (51.0%)	1210 (54.2%)	1255 (55.7%)	1117 (57.4%)
Total	2425 (100 %)	2173 (100 %)	2232 (100 %)	2254 (100 %)	1945 (100 %)

Note: Data of August 2019 excludes staff of sanitation related sections.

[Findings and Issues]

- ✓ Many offices are headed by non-officer level staff.
- ✓ The number of officers are insufficient.
- ✓ Roles of each staff level is not clarified.
- ✓ In present, span of control of AE level is too large, and group leader level is not developed well.

2.2.3 Educational Background

The table shows the staff number in EDWS by categorizing five educational backgrounds.

Table 2-4: Staff number and composition by educational background

	Non-Permanent		Permanent		Total	
	Number	%	Number	%	Number	%
Master degree	3	0.3%	7	0.9%	7	0.5%
Bachelor (Engineer)	92	8.3%	32	3.9%	124	6.4%
Bachelor (Others)	232	21.0%	201	24.5%	433	22.5%
High school graduated	126	11.4%	56	6.8%	182	9.5%
Incomplete high school and below	650	58.9%	525	63.9%	1175	61.1%
Total	1103	100.0%	821	100.0%	1924	100.0%

Findings,

- Number of non-permanent engineers are three times higher than permanent engineer.
- The number of under high school accounts for more than 60% of total staff.
- Number of master degree holders are rather low.

Suggestions for HRD Plan

- The department should support the staff for their further studies especially master degree.
- The department should support its staff for their professional development and work-related capacity development.
- Each activity of HRD should be carefully designed according to target staff's educational background to match their capacity to learn.

2.3 Turnover rate

The table below shows the statistics of staff number and turnover of Water Resources and Water Supply Authority in five years from 2015 to 2019.

After training participation, non-permanent staff shows significant trend of lower turnover. In general, turnover of WA is quite high, about 17 % of total WA have left every year. In contrary, training participants of WA tend to stay job; less than 1 % of total WA participants have left in last 2 years.

(Unit: person, as of Jan 1)

Table 2-5: The number of staff and resignation by staff category

		2015	2016	2017	2018	2019
Staff No.	Total	2,116	2,165	2,173	2,232	2,254
	Permanent	1,139	1,103	1,065	1,022	999
	Flat/DW	188	188	174	756	719
	WA	789	874	934	454	536
Resignation	Total	188	205	238	169	57
	Permanent	47	48	53	33	3
	Flat/DW	8	14	21	41	21
	WA	133	143	164	95	33
Turnover rate	Total	8.9%	9.5%	11.0%	7.6%	7.6%
	Permanent	4.1%	4.4%	5.0%	3.2%	0.9%
	Flat/DW	4.3%	7.4%	12.1%	5.4%	8.8%
	WA	16.9%	16.4%	17.6%	20.9%	18.5%
Turnover rate after training	WA	N/A	17.2%	12.2%	0.5%	0.0%
	Other staff categories	N/A	0.0%	7.2%	7.3%	0.7%

*Resignation includes retirement.

*Turnover of 2019 is counted until one of April.

*Turnover rate was calculated: total resignation in a year/total staff number

[Findings]

- ✓ Turnover rate of WA is far higher than other.
- ✓ WA resigns all through the year (every months).
- ✓ Correlation between training participation and turnover, turnover did not change largely in 2016 when only 3 courses were conducted.
- ✓ From 2017, training course were delivered monthly, and turnover of WA participating in training dropped significantly.
- ✓ Although many young WA participated in training courses, only 35 among 227 WA has quit after training participation. It can be said that training is effective to retain younger staff.

2.4 Motivation to Work

To understand motivation factors of staff, questionnaire survey was conducted in 2017. All staff of EDWS was targeted and 1041 staff, 49% of the all, responded. Each staff was able to select 3 items at maximum of “What is important to work?” The results was as shown in the figure below.

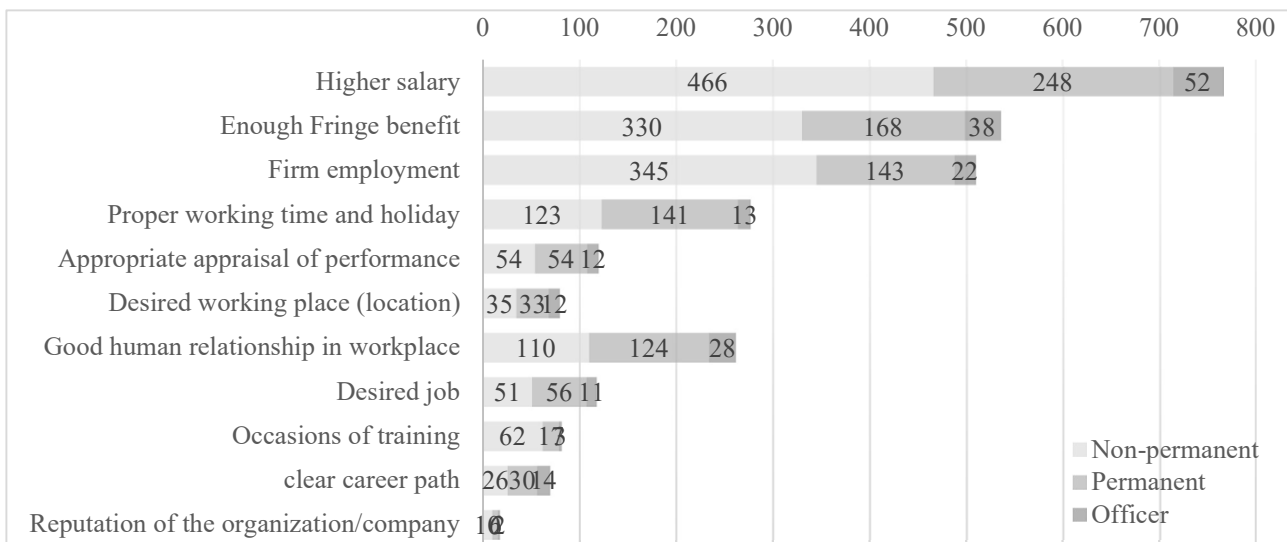


Figure 2-5: Motivation factors of staff by staff category

[Findings]

- ✓ Salary is the critical factor, especially for non-permanent staff.
- ✓ Fringe benefit and firm employment are also crucial for all staff level.
- ✓ For staff level, proper working time/hour/holiday are important.
- ✓ Many staff put priority on good human relation in working.
- ✓ Non-permanent staff feel good to have training opportunities.

Salary is the biggest factor for working motivation, and a key reason to quit job for young staff. The table below is the result of salary survey of private companies in 2018 according to “Salary Survey Report 2018”. Comparing with private company, the salary level is far below than the market price. For example, young engineer can earn 300,000 kyat/month in a private company while 108,000 kyats/month in YCDC as non-permanent staff.

Table 2-6: Salary survey result in engineering company in Myanmar (Unit: Kyat/month)

Staff level	Minimum	Median
Chief Engineer	600,000	900,000
Engineer	350,000	700,000
Assistant Engineer	300,000	400,000
Accountant	300,000	400,000
Office Staff	200,000	300,000
General Worker	150,000	180,000

Source: DICA, Ministry of Planning and Finance (2018) “Cost of Doing Business in Myanmar, Survey Result in 2018”

Table 2-7: Salary table of YCDC (Unit: Kyat/month)

	Staff level	Minimum	Maximum
Permanent employee	Chief Engineer	418,000	438,000
	Assistant Chief Engineer	341,000	361,000
	Executive Engineer	308,000	328,000
	Assistant Engineer	275,000	295,000

	Supervisor level	234,000	244,000
	Sub-assistant Engineer level	216,000	226,000
	Skillful worker 4	180,000	190,000
	Skillful worker 5	162,000	172,000
Non-permanent employee	Flat (high school graduate)	108,000	108,000
	Flat (incompletion of H/S)	102,000	102,000
	WA	4800/Day	4800/Day

Source: YCDC Salary table effective since xx/2018.

Based on this survey result, HRD plan should discuss how to improve motivation of staff.

2.5 Workload imbalance

In 2016, the survey of workforce in each T/S office was conducted. The figure below shows the number of total staff and WA in each T/S office. The offices are sorted by the number of metered connection which can be regarded as one of the typical workload indicators of each T/S office.

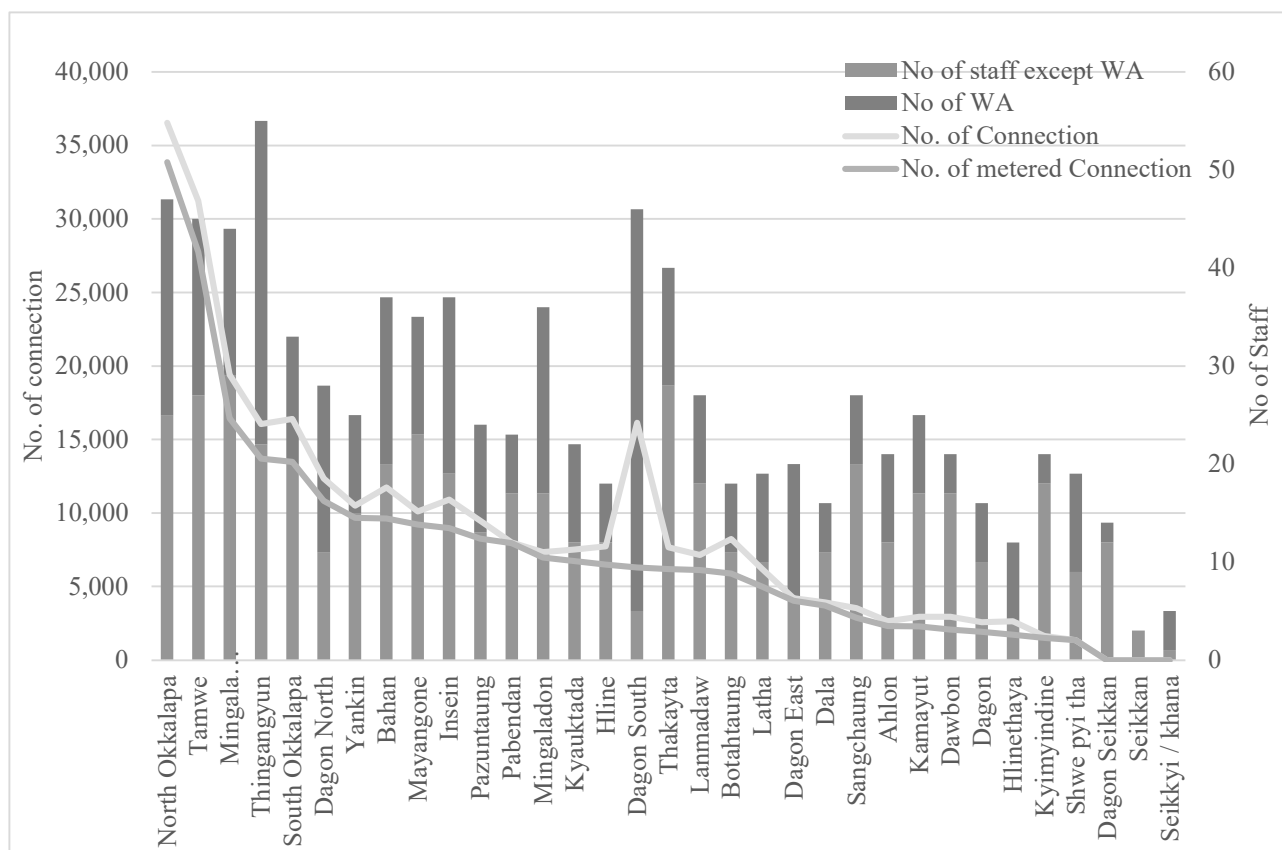


Figure: Number of staff and WA in each T/S office

[Findings]

- Ratio of WA staff largely varies by office.
- The number of staff of each T/S office is not closely correlated with the number of metered connection. Staff number is not allocated responding to objective work load analysis.

[Issues]

- Since T/S offices constantly face lack of workforce, there are some volunteers for supporting T/S works, especially for office work and NRW work, without wages. It is difficult to grasp

accurate necessary workload in each office because the volunteers are not counted in the staff number.

- In WTP, WA is considered as an operator, and the situation seems to be same as in pumping stations. Without WA, the operation works cannot be implemented properly.

2.6 Necessity of HRD

Facts which requires sustainable HRD system in EDWS

- ✓ Employment age as permanent staff is around 35 years old because EDWS does not have authority to manage employ/promotion of staff as needed.
- ✓ Many clerks and accountants of EDWS are retiring in several years.
- ✓ In near future, EDWS will faces difficulties in HR for sustainable service.
- ✓ The number of staff in each level is imbalance for efficient hierarchal management.
- ✓ Staff with lower education accounts for more than half.
- ✓ High turnover rate especially of younger staff.
- ✓ It is difficult to recruit and retain qualified staff since employment condition is not attractive.
- ✓ There is few institute such as university or research institute related to water supply in a country
- ✓ EDWS plans to implement a lot of expansion project near future.

In the near future, more and more capable staff is necessary in terms of not only staff number but also range of expertise since the water supply business scale is projected to expand rapidly.

2.7 Responsibilities of HRD in YCDC

HRD Section was established on 15 August 2016. The internal order (93/2016) defines duties and responsibilities of HRD Section as follows:

1. Assess HRD needs and propose HRD measures.
2. Plan, implement, evaluate and record training affairs.
3. Enhance OJT activities in workplace
4. Maintain organization chart/job description updated

Chapter 3 Integrated training program based on training needs

3.1 Current situation

3.1.1 Existing training courses

HRD Section has launched prioritized training courses since 2016. For selecting pilot training courses, we put priorities on subjects directly related to water supply, and younger staff and workers/technicians, for which the existing trainings have rarely targeted. Until now, as 6 types of pilot training courses have been conducted as follows:

- ✓ For New staff (less than 3 years of working experience) for all staff group

- ✓ For Pre-officer (Deputy T/S Officer, SAE, Supervisor, Deputy Supervisor)
- ✓ For T/S Officer
- ✓ Basic PC skill
- ✓ O&M of tube well pump
- ✓ Water engineering lectures

The number of training courses are limited one in a month. Due to quite busy period, no training course is conducted in April. Therefore, 11 training courses are regularly conducted in a year.

3.1.2 Training participants

The implemented training courses were summarized in Table 3-1. 36 training courses have been provided for 731 staff in total; 3 courses for 60 staff in FY2016, 12 courses for 261 staff in FY2017, 13 courses for 265 staff in FY 2018, and 8 courses for 145 staff in 2019 (by the end of August) respectively.

Table 3-1: All pilot training courses implemented by EDWS

No.	Category	Training course	Target	Times/the number of participants
1	Training by level	For new staff (Engineer, clerk, worker)	New staff (less than 3 years of service)	For Engineer 6 times, 135 trainees For clerk 5 times, 100 trainees For worker 6 times, 180 trainees
2		For pre-officers	Deputy T/S engineers, Sub-Assistant Engineer level	3 times, 58 trainees
3		For T/S engineers	T/S engineers	2 times, 40 trainees
4	Training by duty	O&M of tube-well pump	Pump operators of T/S	3 times, 60 trainees
		GIS and pipe mapping	Engineers in Pipe Section (1-4)	1 time, 12 trainees
		YTU Lectures	Engineers	1 time, 40 trainees
5	Support for self-learning	Basic PC skill	Office staff of each Section	9 times, 106 trainees
Total				36 times, 731 trainees

* As of end of February 2019, accumulated number since the Project start.

3.1.3 Trainers

Trainers have been mainly assigned from officers of section head level. In addition, they are expected to appoint their subordinates as a training assistant to bring younger generation up to a trainer in future in order to increase the number of internal trainer. With more number of trainers, specific officers do not need to bear a heavy load as a trainers, so that training implementation can be more sustainable. Until now, the number of staff/officers who have already delivered training amounts to 43 as listed below.

Table 3-2: List of internal trainers (actual)

Fields	Subjects covered	Trainers in charge (of a part of subjects listed in the left column)
Overview	Mission & vision of EDWS, Overall concept of YCDC EDWS water utility business cycle Future Plan of EDWS, Sanitation	CE, Mr. Zaw Win Aung (AE) 2 trainers
Administration, Finance, management	Leadership & Management, Administration, Finance, HRM&HRD, Way of Working, Regulations, Safety Working, 5S & Kaizen	CE, Mr. Win Zaw Oo (EE) Ms. Khin Zin Mar Myint (AE) Ms. Khin Khin Htwe (AE) Ms. Ni Mar Zin (AE) 5 trainers
Services, customer related	House Connection, Customer Service, Billing & Collection, Public Relation, Complaint Management House Connection, Township Office Work	Ms. Thin Thin Soe (ACE) Ms. Thwae Naing Oo (ACE) Ms. Aye Aye Mar (EE) Ms. Mar Mar Aye (AE) Ms. Ni Mar Zin (AE), Ms. Cho Lae Soe (AE) 6 trainers
Technical, engineering related	Water supply and distribution (El & Mech facilities management) Reservoir and production, water treatment Water Quality, Sanitation	Ms. Aye Pa Pa Nyo (ACE), Mr. Tin Hla Tun (EE), Mr. Zay Yar Tun (AE) Mr. Kyaw Kyaw San (AE) Mr. Aung Khin Zaw (AE) Mr. Aung Naing Lin (SAE) Mr. Thein Myint Zaw (SAE) Mr. Phone Naing (AE), Mr. Min Thu (AE), Mr. Aung Htoo Naing (AE), Mr. Zaw Oo (AE), Mr. Nyi Nyi Aung (AE) Mr. Moe Zaw Win (AE), Mr. Aung Htut Lin (AE), Ms. Naw Elin Dar (SAE), Mr. Zin Min Latt (SAE), Ms. Tin Zar Lwin (Dy Supervisor) Mr. Tun Win (Dy Supervisor) Ms. Ei Khine Mon (AE), Ms. Thandar Myat (SAE), Ms. Nwe Nwe Zin (SAE), Ms. May Zin Oo (SAE) 22 trainers
Computer	Win 8, MS Word, MS PowerPoint, MS Excel	Ms. Phu Pwint Wai (Flat) Ms. Thiri Win (Flat) Ms. Htet Htet Wai (Flat) Ms. Lae Lae Win (WA) Ms. May Moe Thu (Flat) Ms. Nway Nway Htoo (Flat) Ms. Thandar Soe (Programmer) Ms. Thin Nwe Aye (Flat) 8 trainers

* As of end of August 2019.

3.2 Ideal images

To realize HR Vision, training program can play a key role. The ideal images of training program is as follows.

- ✓ Training can cover fields needed in a timely manner..
- ✓ Younger staff can receive training at least every 5 years according to job position.
- ✓ Younger staff is more focused for training target.(responding to the results of motivation survey and training effectiveness for retention survey)
- ✓ Training should be practical and applicable.

To formulate training program, some criteria was set for effective training.

- ✓ Higher Priority for younger staff (effective also to retain staff)
- ✓ For officers, seminars and workshops are considered (they can learn from experiences).
- ✓ Lowering priorities of training which YCDC/UCSB provides.
- ✓ Priority put not only on urgency but importance.

3.3 Activities to be proposed

In order to grasp training needs in the EDWS, questionnaire survey was conducted. The questionnaire asked to fill the necessary training subjects which are considered to be necessary in 10 years. The opinions can be summarized, and organized according to the priorities mentioned above as the table below.

Training was classified into three categories by its characteristics.

- A. Training courses by level
- B. Training courses by duty
- C. Support courses for self-learning

Table 3-3: Integrated Training Program

No	Subject	Objectives/ necessity	Main Contents	Target (trainee)	Priority
A. Training courses by Level					
1. (a)	Pre-officer level training (Administration 1)	- To understand regulation, general management for senior staff	- Regulation - Leadership and Management (human relation), ethics(peer communication) - Public Communication and Complain Solving - HR Management - Safety Working - General Accounting - Office letter writing - Billing and Collection	SAEs, Supervisors, Dy Supervisors	★★
(b)	Staff level training (Administration 2)	- Difficulties in communication with public - Can't solve complaints while billing and collection	- PR Skill - Complaint solving - Office letter writing - Safety Working - Regulation & Disciplines - General Accounting - Human Relation, ethics, peer communication - Billing and Collection	Staff	★

Human Resource Development Plan
The Project for Improvement of Water Supply Management of YCDC

No	Subject	Objectives/ necessity	Main Contents	Target (trainee)	Priority
(c)	New staff training	<ul style="list-style-type: none"> - Participants understand missions and outline of EDWS works. - To bringing up internal trainers of EDWS. - To enhance capacity of training management. 	<ul style="list-style-type: none"> - Mission & vision of EDWS and Future Plan - Water utility business cycle - Administration, office letter writing, HRD, ethics (peer communication) - Public Relation and customer service - Billing & Collection - Finance - Production, treatment, water quality - Water Transmission, supply and distribution - Management of electrical and mechanical facilities 	All new staff (within 3 years)	★★★
B. Training courses by duty					
2.	Accounting	<ul style="list-style-type: none"> - To understand financial rules and regulations and to support the organization - To be able to perform statistical works accurately and effectively 	<ul style="list-style-type: none"> - Bookkeeping - Accounting works 	Cashier, staff in charge of accounting in sections, divisions and T/Ss	-
3. (a)	Pipe Connection and repair (Distribution & Service pipe)	<ul style="list-style-type: none"> - To become systematic in water supply, pipelines, meter maintenance - To supply water efficiently to customer and to reduce NRW 	<ul style="list-style-type: none"> - Reasons and countermeasures of NRW - Pipe fitting, connection (HDPE, PVC, CI, DI & MS) - Pipe repair - Operation of Valve control, Systematic maintenance of pipe - Distribution network system - Standard installation of valve, meter, - Prevention of illegal connection - Safety Working 	NRW staff in townships	★★
3. (b)	Pipe Connection and repair (Transmission pipe)	<ul style="list-style-type: none"> - To become systematic in water supply, pipelines, meter maintenance - To supply water efficiently to customer and to reduce NRW 	<ul style="list-style-type: none"> - Reasons and countermeasures of NRW - Pipe fitting, connection (HDPE, PVC, CI, DI & MS) - Pipe repair - Operation of Valve control - Systematic maintenance of pipe - Standard installation of valve, meter, - Prevention of illegal connection - Safety Working 	Workers in Pipe 1, 2, 3 & 4	★★

Human Resource Development Plan
The Project for Improvement of Water Supply Management of YCDC

No	Subject	Objectives/ necessity	Main Contents	Target (trainee)	Priority
3. (c)	NRW countermeasure	- To supply water efficiently to customer and to reduce NRW	- Physical loss/ Commercial loss - Reasons and countermeasures of NRW - Pipe fitting, connection (HDPE, PVC, CI, DI & MS) - Pipe repair - Flow management, leak detection	NRW section Pipe 1,2,3 &4 (Engineer)	★
4.	Distribution pumps in P/S	- Difficulties: premature damage of motors due to lack of electrical knowledge - To reduce the maintenance cost of machineries	- Systematic operation of pump - Maintenance and monitoring of well and machines - Identification of EL divide damaging	All pump operators in reservoirs and Pumping Stations, and T/S	★★ ★
5.	Meter Reading and billing collection	- To be able to read meters accurately and correctly - To collect fully tariff by reading meter accurately and to receive less Customer complaints	- Meter reading - Billing collection - Commercial loss - How to deal complain	Meter readers and bill collection staff in T/S offices	★★
6.	Water supply planning & design	- To understand how to design pipe network - Predicts pressure and flows under varying conditions and can determine what the existing and future needs are to optimize system performance	- Rules and procedures for water supply management - Management of water demand - Piping network - Customer demands (Current & Future) - Pump, Control Valve and Tank information	Staff in charge in Pipe Section, Reservoir Section, Water Supply, Design, Planning Section	★
7.	Design Standards/ Criteria of pipe installation & Cost Estimation	- To understand systematic pipe laying works. - To understand how to estimate cost of pipe laying works	- Rules and procedures for water supply management - Design standards - Cost estimation	Engineers in T/S & Pipe Section Planning Section	★
8.	Service Connection (Domestic Water Supply)	- To ensure working procedures and quality of plumbing works.	- Regulations on service connection - Standards of plumbing - Tapping method	License Plumber (LWSE) House Conn. Sec. T/S Workers	★★
9.	Water engineering	- To understand how to apply engineering theory into practices.	- Hydraulics, pipe flow	All engineers	
C. Support courses for self-learning					
10.	PC Skills: Basic skills	- to be able to use basic application and functions of PC.	- How to use PC and Windows, and type Burmese. - Basic operation of Word, Powerpoint, and Excel.		★★ ★

No	Subject	Objectives/ necessity	Main Contents	Target (trainee)	Priority
11.	PC Skills: MS Excel Advanced	- Quick and timely work flow following e – Government system - Using PC efficiently in statistical works and accounting works	- MS excel for statistical work	All staffs	★★
12.	PC Skills: AutoCAD (2D)	- To draw shape of road and household - To draw design drawings and completion drawings of facilities and pipeline.	- Auto CAD for drawing work - (based on sample drawings)	Staff in charge of pipe sections (1-4), Township Office (SAE & JE)	★★
13.	English	- To coordinate with international organization, to be able to communicate during oversea training	- 4 skills of English	All Staffs (2 Groups) - Graduate - High School	★★

3.4 Considerations

- ✓ Secure enough number of qualified instructor.
- ✓ Secure quality of training materials and program.
- ✓ Increase the staff number of HRD Section and develop capacity of training planning.
- ✓ Need to consider expanding training facilities such as training room for future.
- ✓ Utilization of outside training, trainers, and bring-up of internal trainers if lecturer cannot be found in EDWS.
- ✓ Officers needs to understand the importance and significance of training especially for workers and technicians in order to assign proper training participants to match the training target
- ✓ Cost-effectiveness.
- ✓ OJT or internal study conducted in each team, section and office is not included here.

Chapter 4 Promotion of OJT

4.1 Current Situation

4.1.1 Strength

Senior staffs have eagerness and interest in OJT system.

4.1.2 Difficulty

Senior Staff needs to share their experience to juniors systematically.

- Senior staff is too busy to teach to younger
- Small chances to work together with young staff.
- Too low capacity of young staff.

- Senior staff has not enough awareness and knowledge on HRD.

4.2 Future Image of OJT

- OJT should be practiced because contents are directly related to present duties, contents can be difficult for documentations and learning at each staff's pace.
- To take at least one year to train a new staff with OJT
- OJT can enhance the familiarity and mutual understanding & communication between juniors and seniors and it will bring the higher capacity into the workplace.

4.3 Proposal (What/How)

4.3.1 OJT system in Organization

- To clearly explain the role of OJT system to officers, section heads and division heads in order to promote OJT system. (HOW)

4.3.2 OJT Instructor

- Implement OJT by following directives in Handbook. (How)
- Do a review session weekly in which seniors shoot questions to juniors and let juniors do the works while operation of OJT
- Seniors teach juniors by sharing their experience during OJT.
- OJT instructors shall meet very often to warm up ideas for OJT.

4.3.3 Developing Tools for OJT

- All sections keep the data and experience of each Section on paper and send it to HRD section that will make OJT handbook.
- Compile the ideas from meetings and discussions, and create Handout (How)
- OJT teaching Material: SOP (Standard operation procedure), Job Description (What)
- OJT teaching Design: how to teach individually and what kind of thought can be considered (How)

Chapter 5 Self-learning

5.1 Current Situation

- No regular system for encouraging self-learning by staff.
- Resource for self-learning: Only one library in YCDC managed by Admin Dept. Moreover, internet access at workplace is limited to staff in higher position (ACE level and above).
- Ordinary staff has little chance to access to resources such as technical books, catalogs, case study in other utilities.

5.2 Definition:

The steps of which a person does try to develop his knowledge, skills, or mind by his own will.

The activities are done outside of his working time. In general, the impact is expected to be shown in longer term, not in short term.

5.2.1 Advantages for staff:

Occasions for carrier development, maintaining motivation

5.2.2 Advantages/objectives of the managers/organization:

- ✓ Raise the level of capacity of entire staff
- ✓ Cultivate movement of self-development culture
- ✓ Provide equal opportunities to all staff
- ✓ Satisfy requirements of promotion
- ✓ Develop capacity on specific subjects
- ✓ Respond various training needs

5.3 What to learn

Knowledge, skills or mind-set which staff are not required to acquire in urgent, however, it is expected to acquire in the longer term of HRD view.

- ✓ Technical skills/knowledge (wider/related areas)
- ✓ IT and PCs
- ✓ Foreign languages
- ✓ Finance/accounting
- ✓ Safety measures
- ✓ Legal affaires
- ✓ Business skills: reporting/document writing, making plan, project management, management, HRD, customer oriented mind, continuous improvement mind, problem solving.
- ✓ Human skills (how to deal with others): presentation, communication, negotiation, coordination, leadership, team-working

5.4 Available resources

- On their own; utilization of library, PC room, at workplace.
- Educational institutes, universities, private schools, NGOs
- Outside seminars, workshops, events
- Language institutes
- Study abroad
- Distance learning/ online education
- E-leaning/WBT (Web based training)

5.5 Proposals

- Expansion of the library
- Expansion of PC room; access to resources such as training/seminar materials, meeting records and slides.
- Internal application system to attend outside seminars, training
- Support system (tuition fee, financial reward, time arrangement, other considerations)
 - ✓ for attending outside seminars, training
 - ✓ for join distance education
 - ✓ for gaining outside licenses/certificates
- Environment for accessing references, data
- Establishment of Knowledge Management System

5.6 Considerations

- Continue improving the program/system
 - ✓ When experiences and know-how is documented or visualized, it can be learnt by individuals.
 - ✓ Intangible knowledge (experiences, know-how) should be turned to tangible/visible form (such as manuals, SOP) to enable to utilize for educating others.
- Select proper subjects, topics: the subjects should be related to the actual work.
- Clarify the target: mainly junior staff and junior managers (some 5 to 15 years of service period)
- Consider that how to make the effective programs, as well as how to inform them well of the target staff.

Chapter 6 Motivation Management System

6.1 Current Situation

6.1.1 Strong

Arranging in Transportation, Accommodation for staffs in EDWS

- (2) As EDWS has Employment Security System, it can offer job related security and firm to the staffs.
- (3) Implementing the Projects with the coordination of competent Technicians and providing required trainings

6.1.2 Difficulty

- Lack of plan for Bonus separately
- The causes of Poor Motivation are (1) Low Salary (2) No incentive (3) Misuse of Human Resources (4) High degree of Top Down (5) Unsecure promotion system / opportunity (6) No performance and personal evaluation system.
- The causes of No Incentive are (1) Few Chances to Attend Training (2) No Bonus system for Performance & Ability in job (3) Not Support for Self-Study.

- The causes of Misuse of Human Resources are (1) Not Right People in Right Place (2) no clarified job description for individual staff (3) Few Knowledge about HRD.
- The causes of High degree of Top Down is some employee can only do the tasks with the instructions of Upper Level.
- The cause of unsecure promotion system / opportunity is it takes so long to get promotion.

6.2 Future Image of Motivation Management System

There are (3) parts to implement Motivation Management System. They are (1) Ability (2) Motivation (3) Opportunity. Knowledge and Skill are under Ability. Motivation is directly connected with Incentive System. Opportunity means Right People in Right Place in the Organization. That's why Motivation (part 2) is very important to enhance the Performance. The more the staff can perform, the more success to get the aim of Organization. When the staff can perform well, it'll be easy to reach the organization's goal.

6.3 Proposal (What/ How): Motivation Management System in Organization

6.3.1 For Internal Motivation

(1) Enhancing Kaizen & 5s activities

- They can work actively
- Practicing 5S Bottom/Up System by discussing within the staffs (by approaching/using 5s and Kaizen method)
- To encourage the staff to pay attention in their work place. By listening the other's opinion, there will be a good progress in the workplace.

(2) Enhancing team learning (work place learning)

- Share lessons learnt
- Encourage discussions.
- Solve the problem together with team/ Solving the problems together

(3) Introducing specialist staffs

- By implementing the JOT in the department, it'll bring up the qualified staffs in the department as to the respective field/ subject.
- These staffs are expertise in their respective field of operation. They help line executive in planning and control.
- Example; NRW, Design Section, GIS, Water Quality, Measuring water flow, pipe connecting, electrical installation

(4) Frequent job rotation

- Rotation to the places of the same level and work and getting professional activities (3 to 5 years to rotate)
- Can help the staffs motivate.

- Job rotation can make the staffs improve their interests and stimulation, and can avoid being lackluster/weary of staffs.
- Suppose to increase employee interest level and motivation

6.3.2 For External Motivation

Internal Incentive for staff should be offered rather than External Incentive. Employees should be evaluated based on their performance according to levels and workplace, and should be awarded

(1) Awarding good performance staff

To award medals and certificates based on performance of staff.

(2) Appraisals from coworker

Appreciate the staff by praising (by other staffs) as peer assessment

(3) Providing discretion for job

Giving the chance to solve out the problems based on their rank (for example- to practice according to the road system and not to practice railway system)

6.3.3 For Working Environment

(1) Transparent Examination at recruitment

- Competent employees are appointed by exam.
- Giving workplace that match employees' skills and apply.
- Can know if the interest of applicant matches with the vacancy of department.

(2) Orientation for freshman

- To explain the vision and mission of the department and why the qualified staffs are important for the department and why the department itself is also important.
- To explain how important the staff's knowledge and skill to be able to provide good service and become powerful organization.
- Foster relationship as a member of the office. (warm welcome)

(3) Internal Recruit System

- To learn staff's desires and hopes in their department.
- To stop the complaints of staffs and employees.
- To provide staff a chance to get opportunities.

✓

(4) Increasing occasions for staff to talk with top management

- To become fairly and friendly workplace.
- Good practice of Up to Bottom Knowledge sharing.

- To understand that the achievement of each team is directly proportional/related to the achievement of organization.

✓

(5) Involving Staff into decision making in major issues

- To let the staffs know that they play in the important role of the organization.
- Able to make decisions in routine
- The staffs to know that they are the most responsive in their designs works
- Improve their mindset and performance.

(6) Open Office for Staff Family

- To enhance of relationship and communication among the staffs
- The employee's families need to courage to their relatives to do well.

Chapter 7 Personnel Appraisal System

7.1 Current Situation

- Personnel appraisal is used just before promotion occurs.
- Performance is monitored constantly by his/her supervisor and reflected to considerations in promotion.
- Staff rarely receive feedback to improve their performance.
- In general, the factors listed below are regulated to be appraised for promotion, however, objectivity of the appraisal depends deeply on each supervisor.
 - ✓ Experience and service year
 - ✓ Working performance
 - ✓ Education background, certificate
 - ✓ Training participation record

7.2 Objectives of personnel appraisal

7.2.1 For staff

1. Communication of organizational values and objectives: providing feedback on their work.

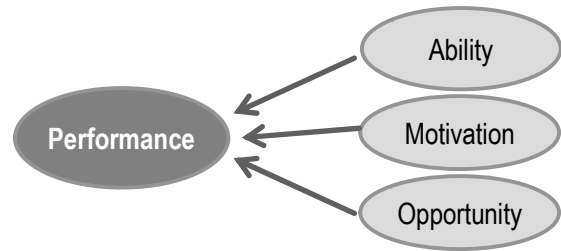
No feedback means tacit approval of the employee's performance and no correction in performance or attitudes is required. So, unless feedback is provided, weather positive or negative, nothing changes. Performance appraisals are a formal tool used for this purpose. The appraisal is worthless, though, unless the employee knows what is expected of him/her.

1. Information for self-improvement: establishing new goals and objectives for the next period

7.2.2 For managers/organization

1. Evaluation to improve job matching (*between duties and abilities*)
2. Training and career development: serving as a basis for career discussions
3. Pay/promotion for performance: providing a justification for pay/promotion actions

4. Assess and develop capacity of mid-management
5. Identify and deal with work-related problems



7.3 What to be appraised

7.3.1 Performance

- ✓ Working volume, speed
- ✓ Quality (accuracy, well qualified)

7.3.2 Capacity

- ✓ Core capacity (to understand, make judgment, express, negotiate, make direction, make plan etc.)
- ✓ Technical capacity and knowledge (expertise, experiences)
- ✓ Skills

7.3.3 Motivation (attitude)

- ✓ Personality (sense of responsibility, working in cooperation)
- ✓ Well-motivated to work
- ✓ Working process

7.3.4 Opportunity (allocation of staff)

- ✓ Numbers (Is the number enough?, Is balance of staff level good?)
- ✓ Allocation of duties (fitting to staff capacity or not?)

7.4 Proposals

- a) Periodical discussion with individual staff
- b) Daily communication to provide suggestions for improving performance.
- c) Career path consultation: hearing staff's interests and making advice to build working career.
- d) 360 degree evaluation/multi-level appraisal:

[Criteria of appraisals]

- e) Management by Objectives (MBO)
 - ✓ Each individual takes part in designing their set of targets.
 - ✓ Appraisal to what extend the staff can achieve the objective they committed to implement at the beginning of the period.
 - ✓ Strong points: staff has working objectives individually and can commit on them. It can increase internal motivation.
- f) Comparing based on competence of high performer
- g) Capacity assessment: core & technical capacity

7.5 Considerations

7.5.1 1) Appraisal must be persuasive

Can the appraisal result be agreed and felt acceptance by staff?

Staff should be convinced by the result.

Some aspects help increase persuasiveness;

- ✓ Objectiveness: Appraisal should be made based on the fact, eliminating subjective view of the appraisers.
- ✓ Fairness: appraisal should be made with no bias which brings addition/deduction to certain staff. It means to eliminate variations in appraisal and give the same appraisal no matter who conducts it.
- ✓ Validity: Appraisal criteria should be aligned with organization's policy, etc.
- ✓ Transparency: Mechanism, criteria and procedures of appraisals should be disclosed to all staff.

Need to provide staff an occasion 1) to make a feedback of the appraisal result by the boss and explanation of the reason, and 2) to make the objection to the results.

7.5.2 2) Appraiser plays significant role in effectiveness of personnel appraisal

- The effectiveness greatly depends on how the appraisal is conducted.
- Appraiser needs to work not only as a appraiser but also a coach to show the staff what and how to improve.
- It is essential to have relationship of mutual trust and communication between an supervisor and its staff.

7.5.3 3) Make benefit > cost & effort

- The appraisal should be carefully designed according to its principle objectives so that its benefit could be greater than its cost (time, energy, and efforts)
- The results should be fully utilized.

Chapter 8 Prioritized Actions and Implementation Schedule

This HRD Plan divides the countermeasures to improve the prioritized issues for shorter term, and longer term.

Stage 1 (2019/20 – 2021/22): 3 years for immediate actions to improve the situation

Stage 2 (2022/23 – 2025/26): 4 years for steps forward to realize sustainable HRD image

8.1 Proposed activities in 3 years (2019/2020- 2021/2022)

8.1.1 Identification of prioritized issues

From the Chapter 3 to Chapter 7, various measures to improve the present situation are proposed. Some should be implemented immediately, and others would be considered in long-term mainly due to administrative circumstances.

To set implementation priorities of proposed items, questionnaire survey was conducted targeting top management of EDWS (EE and above); 25 officers. The issues related to staff working which are frequently seen in EDWS were prioritized to be undertaken urgently as the table below.

Table 8-1: HRM issues frequently seen in EDWS and priorities for urgent improvement

No.	Issues	Score	Responds
1.	No system to retain young capable staff.	63	15
2.	Department has no authority to employ the staff as required	46	12
3.	Lack of the number of specialists in each field for future.	38	13
4.	Staff's low motivation to work.	31	8
5.	Duties and staff are not assigned in good balance.	29	11
6.	High turnover of younger staff.	28	8
7.	Lack of the number of staff who grasp the situation from the wider point of view.	27	13
8.	Staff does not care to follow the rules/regulation.	25	8
9.	No standardized procedures to employ/recruit new staff	20	8
10.	Staff's low awareness to learn.	16	4
11.	Ability (skills and knowledge) of young staff is insufficient.	14	7
12.	The organization is weak to work in team effectively.	13	7
13.	Poor transparent procedures in promotion, selection for foreign training.	13	4
14.	Managers/supervisors are too busy to care for staff.	5	2
15.	Duties are not effectively shared among staff.	5	3
16.	Staff are too dependent to supervisor.	2	2

*Score is converted from priority 1 to priority 5.

The top three items are obviously regarded as important issues to be tackled urgently by many executives. Therefore, this HRD Plan put priorities on these three items in the first 3 years.

- No. 1 No system to retain young capable staff.
- No. 2 Department has no authority to employ the staff as required
- No. 3 Lack of the number of specialists in each field for future.

The biggest issues of frequent turnover of young staff can be analyzed as follows. The most influencing factor is considered as “uncertain about the timing to promote for a permanent staff”

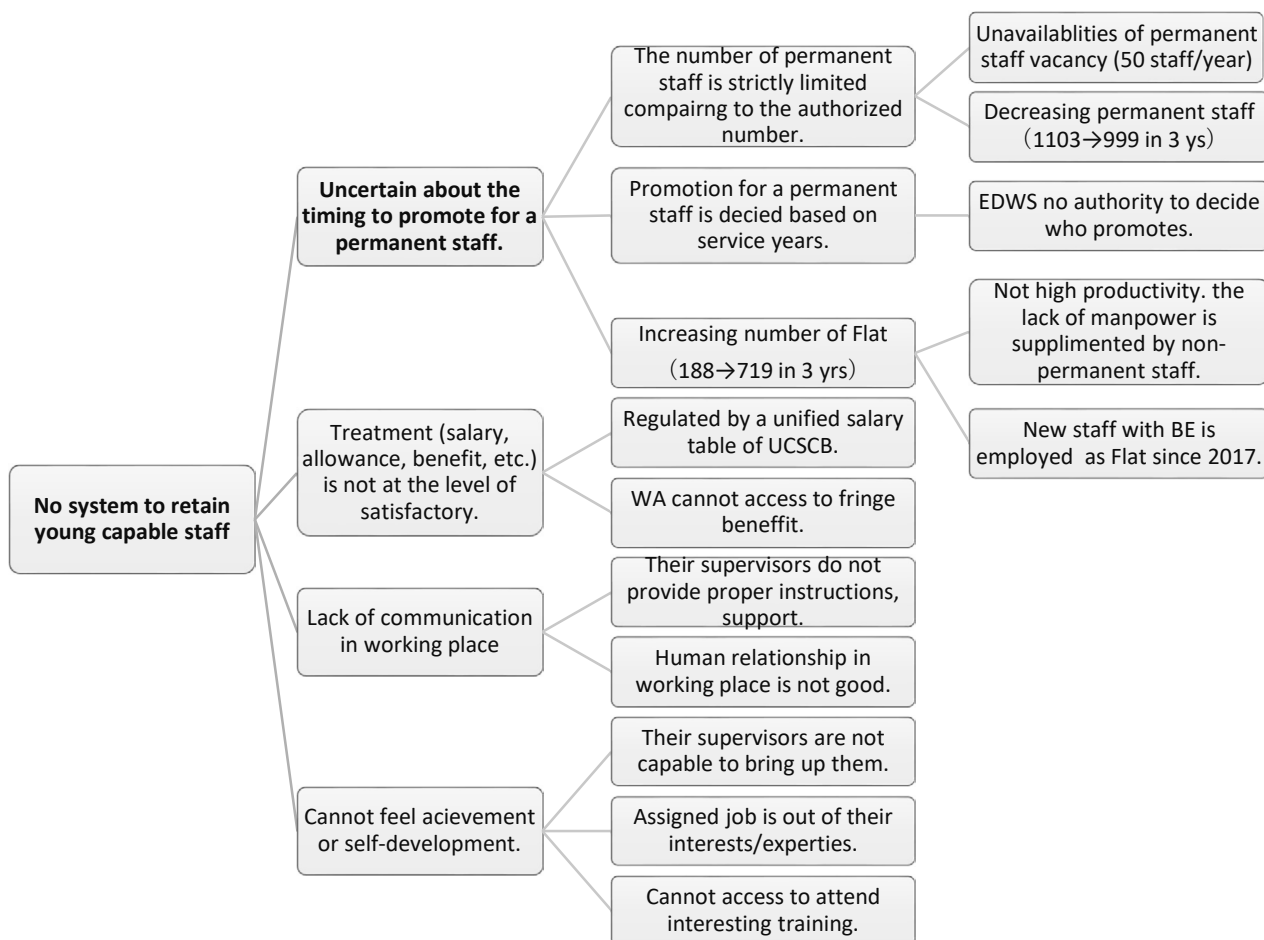


Figure 8-1: Problem analysis on turnover of young staff

In addition, the problem “uncertain about the timing to promote for a permanent staff” can be considered as the one of major root causes of other prioritized issues as listed below.

- No. 3. Lack of the number of specialists in each field for future.
- No. 4. Staff’s low motivation to work.
- No. 6. High turnover of younger staff.
- No. 7. Lack of the number of staff who grasp the situation from the wider point of view.
- No. 11. Ability (skills and knowledge) of young staff is insufficient.

As discussed in Chapter 2, the promotion from non-permanent staff to permanent staff needs longer service period recently than before. Non-permanent staff have to wait more than 10 years, and tend to be employed as a permanent staff at their late 30’s. This causes high turnover of young non-permanent staff, and lowering working motivation, difficult to bring up younger generation. This is caused by the political transition in 2015. Until then, the employment and promotion of staff in YCDC was under authority of Mayor. After shifting to new government in 2016, however, the authority was transferred up to region government, and recently, it requires union government level’s final confirmation. The present situation already got attention of management level of YCDC.

8.1.2 Goals of the first 3 years.

In order to improve the situation pointed out as prioritized issues, the primary goals of first three years targets are set as;

- Reduce turnover of younger staff
- Bring younger staff up for the next generation
- Shorten the maximum service year as non-permanent staff
- Take actions to improve employment system of new staff

To achieve those goals, there may be possible measures as follows.

- Clarify criteria to employ permanent staff (It requires to raise awareness at union government level)
- Provide training opportunities to younger staff
- Strengthen support from supervisors to younger staff.
- Improve communication in workplace

8.1.3 Provide training opportunities focusing on younger staff

Providing training to younger staff is quite effective not only in terms of HRD but of retention of staff. Training program was proposed in Chapter 3, among which the following factors were considered as criteria for first 3 years' activities.

- To continue the New Staff Training Courses
- To prioritize the trainings that target the younger staff
- To prioritize younger staff for selection of each training course
- To provide the training to younger staff (35 and younger) at least once in every five year with combination of trainings organized by YCDC/UCSB.

8.1.4 Strengthen support at workplace to younger staff

8.1.4.1 Promotion of OJT

As proposed in Chapter 4, OJT should be promoted more in each office. Head of Section is considered as the focal point to carry out effective OJT for younger staff in each work place. During the first 3 years, strengthening capacity of the Head of Section as an OJT instructor will be focused. The main activities are as follows:

- ✓ Workshop to bring up senior OJT instructors: Senior instructor is expected to be a trainer for Head of Section.
- ✓ Prepare OJT Handbook:
- ✓ OJT instructor workshop: \

8.1.4.2 Develop mindset

- ✓ For supervisor: Through OJT Workshop and training courses, mindset for HRD should be improved. In training courses for Pre-officer and upper level, one session is added for it.
- ✓ For subordinate: At new staff training at every level, one session treats OJT and HRD for well understanding what staff their self are expected to be.

8.1.4.3 Office management improvement:

- ✓ Assigning core roles to experienced non-permanent staff. It can help non-permanent staff to accumulation of their experiences, and be motivated through more independent work.
- ✓ Promoting team working
- ✓ Promoting regular meeting in workplace: In order to share information and listen to the voices of staff.
- ✓ Strengthen group leader level (SAE level) capacity to communicate well with staff for improving working environment of younger staff.

8.1.5 Clarify criteria to employ permanent staff

In order to improve the situation, it is essential to reform the employment/promotion system. Although EDWS does not have authority to do, it is necessary to talk with higher level to explain the situation and necessity to review recruit/employment criteria.

- Employ non-permanent staff only when critically needed because there are little expectation of promotion to permanent staff within few years.
- Improve timing for employment, to set certain timing for the promotion

8.2 Proposed activities in the following 4 years (2022/23- 2025/26)

From FY2022/2023, undertakes to step forward to realize sustainable HRD are focused. The sustainable HRD has been clarified as “Ideal future image of EDWS” in 2015 as shown in the figure below

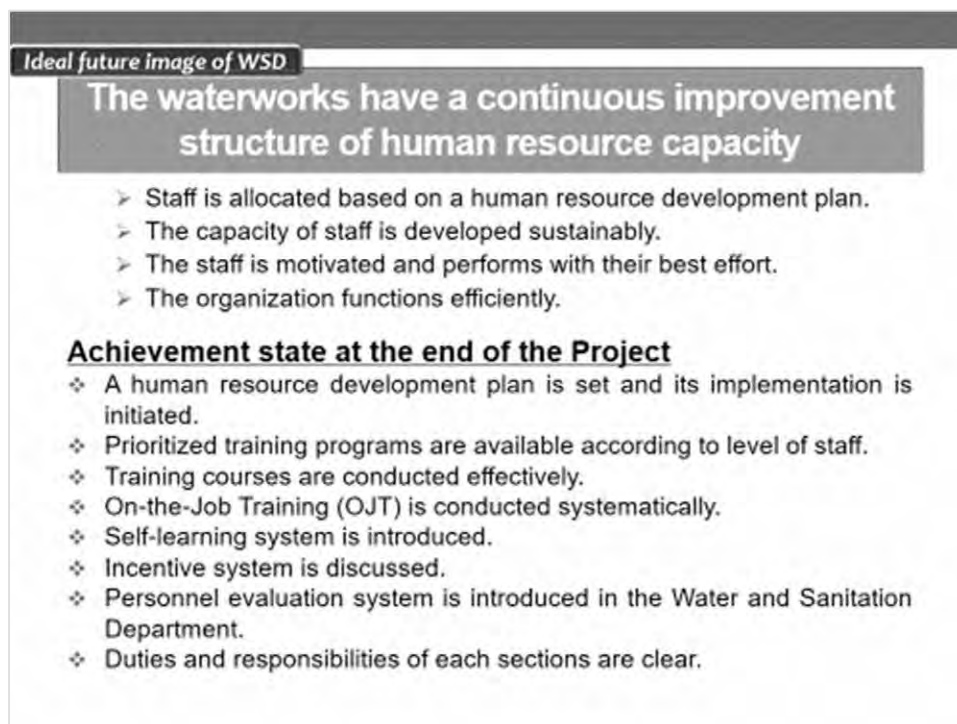


Figure 8-2: Ideal images of HRD in EDWS

To realize it, main objectives of the following four years can be focused to;

8.2.1 Rise working motivation of younger staff

- Continue prioritizing younger staff for training.
- Support for self-learning: especially for further study by outside training or master course.
- Adjust title name of staff level: converting title names for showing engineer's position such as converting "Assistant Supervisor" into "Junior Engineer".
- Discuss to improve working treatment (salary, leaves, benefit, etc.) of non-permanent staff.

8.2.2 Establish regular training courses for each level and duty

- Continue the existing training courses and enhance its effectiveness by HRD Section.
- Launch other training courses prioritized in the Chapter 3 accordingly under cooperation with related sections, so that every staff who needs training can have occasion to develop their capacity according to their level and duty.

8.2.3 Strengthen HRD implementation system including HRD Section

- Increase the number of staff in HRD Section to implement necessary training courses.
- To increase training management capacity, at least 3 full-time staff is necessary to be assigned so that 2 training courses can be managed in parallel.
- In order to increase the number of training, HRD Section should delegate training implementation function to Division/Section level, and manage all information of the training courses in Division/Section.
- To conduct regular training needs survey to update training program and its priorities.
- Expand training function as a training center not only for staff of EDWS but for staff of other water supply utilities as needed for water supply sector in Myanmar.
- Secure budget for outside lecture for specific training such as English, and Auto CAD.

8.2.4 Set up transparent personnel appraisal for performance management

- Introduce regular individual staff meeting between each supervisor and staff.
- Utilize training records and its achievement for evidence for staff performance.
- Supervisor should provide feedback to subordinate on their performance for their further improvement, necessary training etc.

8.3 Manage staff number properly based on expansion of the organization.

8.3.1 Proper staff composition according to staff level

Now YCDC is under proceeding the approval of a new organization structure with the assigned staff number of each office. Based on the span of control of officers to realize proper management as an effective hierarchal management structure, the role of each staff level and the composition ratio of each staff level can be proposed as below.

Table 8-2: Roles and proposed composition of staff level

Staff level	Roles	Span of control	Composition
ACE and upper	Showing direction	5	-
EE level	Head of sections. The larger scale of office is headed by EE level.	4	1%
AE level			4%
Supervisor level	Group leaders in section, office	5	3%
SAE level			12%
Staff level	Staff		80%
Non-Permanent			

8.3.2 Staff number in 7 years

In order to realize the proposed composition above in year 2026, the proposed staff number of each staff level are calculated as table below.

Table 8-3: Proposed staff number by staff level

Year	Actual			Plan						
	2017 /18	2018 /19	10 /2019	10/ 2020	10 /2021	10 /2022	10 /2023	10 /2024	10 /2025	10 /2026
Basic Parameters										
Connection ('1000)	327,285	340,122	345232	378,149	383,259	388,369	393,479	398,589	403,699	408,809
Staff/1000 connection	6.9	6	5.6	5.5	5.5	5.45	5.45	5.4	5.4	5.4
Staff number	2232	2254	1945	2,080	2,108	2,117	2,144	2,152	2,180	2,208
Staff number by staff level										
ACE and upper	9	7	6	7	7	7	7	7	7	7
EE	23	22	19	19	20	20	21	21	22	22
AE level	50	55	43	50	58	65	72	80	87	88
Supervisor level	60	66	42	44	45	47	49	51	52	53
SAE level	195	213	159	176	193	210	227	244	262	265
Staff level	685	636	559	744	930	1,115	1,301	1,486	1,672	1,700
Non-Permanent	1210	1255	1117	1,039	855	651	467	263	78	72
Total	2232	2254	1945	2,080	2,108	2,117	2,144	2,152	2,180	2,208

Note: The number of staff is as of 1st January of each year.

8.3.3 Actions for Proper Management of Staff Number

- Clarify necessary staff number at each level and office in terms of number and qualification
- Update D&R of each office based on new organization.
- Organize HRM Section under Admin Division for managing staff in the number.
- Clarify responsibilities of each staff level and category.
- Verify optimal staff number at each office by staff level.

8.4 Implementation Schedule for 3 years

8.4.1 Training courses

Table 8-4: The number of prioritized training courses in each year

No	Subject	Target (trainee)	Priority	2019/20	2020/21	2021/22
A. Training courses by Level						
1 (a)	Pre-officer level training (Administration 1)	SAEs, Supervisors, Dy Supervisors	★★	3	1	1
(c)	New staff training	All new staff (within 3 years)	★★★	3	3	3
B. Training courses by duty						
3. (a)	Pipe Connection and repair (Distribution & Service pipe)	NRW staff in townships	★★		2	2
3. (b)	Pipe Connection and repair (Transmission pipe)	Workers in Pipe 1, 2, 3 & 4	★★			1
4.	Distribution pumps in P/S	All pump operators in T/Ss, reservoirs and Pumping Stations	★★★	1	2	2
5.	Meter Reading and billing collection	Meter readers and bill collection staff in T/S offices	★★		2	2
8.	Service Connection (Domestic Water Supply)	House Conn. Sec., T/S Workers	★★		2	2
C. Support courses for self-learning						
10.	PC Skills: Basic skills		★★★	2	2	2
11.	PC Skills: MS Excel Advanced	All staffs	★★	2	1	1
13.	English	All Staffs (2 Groups)	★★	1	1	1
Total Training Courses /year				12	16	17

8.4.2 Support for younger staff at the workplace

No	Activities	Target (trainee)	2019/20	2020/21	2021/22
1.1	OJT Promotion Workshop to bring up senior OJT instructors	Senior OJT instructors	→		
1.2.	Prepare OJT Handbook	Senior OJT Instructors, HRD Section	→		
1.3.	OJT instructor workshop	Head of section, supervisors		→	→
2.1.	Develop mindset through training courses	Supervisors	→	→	→
2.2.	on OJT through training courses	New staff	→	→	→
3.1.	Office management improvement: Assigning core roles to experienced non-permanent staff	Non-permanent staff	→	→	→
3.2.	Promoting team working	Head of section, supervisors		→	→
3.3.	Promoting regular meeting in workplace.	Head of section, supervisors		→	→

8.4.3 Improvement of staff management

No	Activities	Target (trainee)	2019/20	2020/21	2021/22
1.	Update D&R of new organization	HRD Section	→		
2.	Organize HRM Section	EDWS	→		
3.	Clarify responsibilities of each staff level and category.	HRM Section		→	
4.	Verify optimal staff number at each staff	HRM Section		→	→
5.	Improve timing for employment	HRM Section		→	→

Chapter 9 The Expected Impact on the Productivity

9.1 Primary targets of HRD Plan

As mentioned in Chapter 8, short-term objectives are set as follows.

Stage 1 (FY2019/20 – FY2021/22): 3 years for immediate actions to improve the situation through

- Reducing turnover of younger staff
- Bringing younger staff up for the next generation
- Shortening the maximum service year as non-permanent staff
- Taking actions to improve employment system of new staff

Stage 2 (FY2022/23 – FY2025/26): 4 years for steps forward to realize sustainable HRD image through

- Rising working motivation of younger staff
- Establishing regular training courses for each level and duty
- Strengthening HRD implementation system including HRD Section
- Setting up transparent personnel appraisal for performance management

9.2 HRD's role to achieve EDWS's mission

As noted in Chapter 1, the mission of EDWS is “to supply the clean and purified water sufficiently inside the city territory for the people for drinking”. In order to realize the mission, HRD plays significant role as shown in the figure below. The organization invests in resources to produce final output for their objectives. In case of EDWS, many resources such as WTP, pipes, meters, and customer data are utilized to achieve “supplying clean water sufficiently to the people”. In order to produce the final output, only human resource can handle and manage other resources. In other sense, without improvement of human resource, investment in other resources cannot be fully utilized.

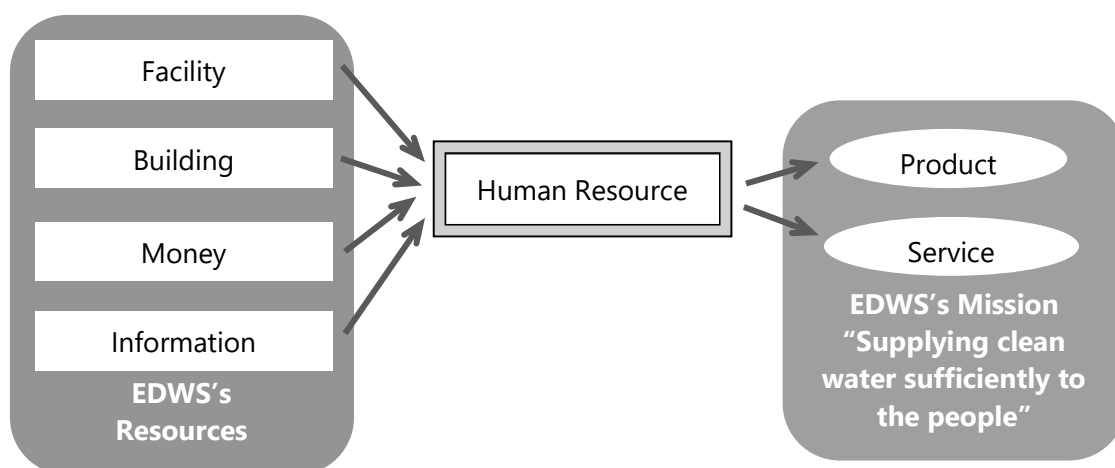
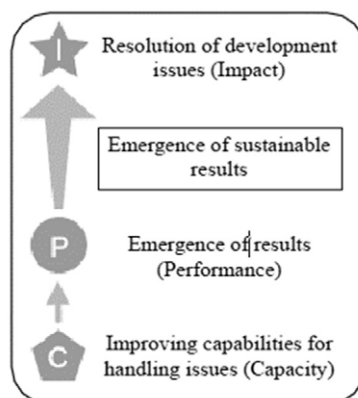


Figure 9-1: Relation between final output of organization and its resources

The concept of capacity development helps to understand the relationship between capacity and performance as figure below. The capacity development itself cannot improve performance immediately, requiring some environmental factors to produce the results of capacity development as performance.



Source: JICA 2008 “Capacity Assessment Handbook”

Figure 9-2: Overall Image of Development and the CD Process

As pointed out in Chapter 2, since EDWS has been aged, EDWS will face difficulties to secure mid-manager level, and core staff in a coming decade. In order to achieve EDWS’s mission, and implement the rapid expansion projects in the schedule with less human resources, it is essential for EDWS to increase “productivity” as an aspect of institutional improvement.

9.3 Current situation of productivity

In current situation, some distinct issues can be pointed out for productivity improvement as listed in the table below.

Table 9-1: Major issues to be improved for the productivity enhancement

Organization	<ul style="list-style-type: none"> ➤ Duties are not assigned based on organizational division of duties description. The organizational structure does not function efficiently. ➤ Since the discretion is not delegated to lower level enough, decision making takes longer time and difficult to take account of the actual situation.
Staffing	<ul style="list-style-type: none"> ➤ The comparison between division of duties of each office and the number of staff is not examined. The gap of work load among offices are large. ➤ There are big gap of individual work load among permanent staff.
Staff	<ul style="list-style-type: none"> ➤ Non-permanent staff cannot see when they are employed as permanent staff. Moreover, due to poor working treatment, their working motivation is easily lost. ➤ There are significant gap of capacity among individual staff. There are a little chance to develop it.
Procedures	<ul style="list-style-type: none"> ➤ A lot of manual work, inefficiency and high possibility of errors ➤ The work procedure is not unified or not thoroughly implemented in entire EDWS.
Information	<ul style="list-style-type: none"> ➤ Quantitative management and monitoring of cost and performance is limited. ➤ Face-face is the main method for sharing information within EDWS. ➤ High cost of data/information sharing.

9.4 How can HRD Plan help in increasing the productivity?

This HRD Plan aims to develop capacity enabling EDWS to achieve its mission. Therefore, HRD Plan includes not only proposals to develop human resources, but also proposals to improve the situation mentioned above

for enhancement of EDWS's productivities.

The followings are some PIs for indicating productivity improvement to be achieved by implementation of HRD plan. As reference, PI of PPWSA (Phnom Penh Water Supply Authority, Cambodia), well-known as the high performance water supply utility, are shown in the same table. The overview of PPWSA's information is shown below, and its business scale is considered to be similar to EDWS according to the number of connection.

Table 9-2: KPI of EDWS and PPWSA

KPI	unit	EDWS	PPWSA (in 2016)
Service coverage ratio	%	30.1	87
Availability of service	hours / day	N/A	24
Supplied water	m ³ /d	761,255	488,312
Connection	No.	327,285	305,000
Pipeline network	km	N/A	2,658*
NRW ratio	%	N/A	6.07
Operating cost coverage	%	68.7	289 (in 2014)
Staff number	No.	2,160	993

*Pipeline network of PPWSA includes only D 65 and larger.

Source: EDWS (2018) Mid-term Management Plan, PPWSA (2016) Training materials for YCDC

9.4.1 Staff number for business scale

1) Total staff number/1000 connection:

This PI is to manage staff number properly based on utilities scale.

Table 9-3: Present and future target of Staff number/1000 connection

KPI	unit	10/2019	10/2022	10/2026	Reference (PPWSA)
Total staff number/1000 connection	No.	5.6	5.45	5.4	3.26

9.4.2 Improving working procedures

1) Staff capable to use PC / total staff

This PI can measure capacity of staff for computerization, by which the working productivity of EDWS would be significantly improved. In EDWS, many works still remain as manual-work. In particular, the works at T/S offices, District offices, Finance Section, Admin Section and House Connection Section, which are responsible for lot of data handling. This wastes a lot of workforce, and has the higher possibilities of data mishandling. To improve productivity, introducing PCs are quite effective.

Table 9-4: Present and future target of the number of staff with PC skills

KPI	unit	10/2019	10/2022	10/2026	Reference (PPWSA)
Total staff	No.	1,945	2,117	2,208	N/A
Staff capable use PC	No.	221	329	473	N/A
PC training (12 pax x 2 times/year)	No.	24	24	24	N/A
Staff capable to use PC / total staff	%	11.36	15.5	21.4	N/A

*Assumption for projection: Increasing the capable staff by the number of PC training trainees x 1.5/year

2) Firm implementation of SOP

- ✓ The number of finalized/ revised SOP in a year
- ✓ The number of staff who uses SOP / total staff

Those PIs can measure how much extend staff can improve their working procedures. Since each SOP indicates proper and efficient procedures for specific duty, observance of SOP increases productivity. After establishing SOPs in each office, the Planning Section would be responsible for monitoring of its application and revision. From the HRD view point, it is also necessary to monitor such PIs to confirm if working procedures are firmly improved or not under the close cooperation with Planning Section. As needed, HRD Section should provide training course or workshop to improve staff’s understanding and awareness about SOP.

9.4.3 Motivation of staff and sustainability of organization

1) Turnover ratio of younger staff

As indicated in Figure 2-4, EDWS will be getting older in their human resources in coming decade. While senior staff members are retiring, and the service scale is expected to expand, younger staff needs to be recruited in coming years. Thus, the retention of younger staff will be more and more significant issues for EDWS.

This PI should be monitored to grasp how much EDWS can retain younger staff (of 35 years old and younger).

Table 9-5: Present and future target of turnover ratio of younger staff

KPI	unit	2017 (actual)	2018 (actual)	2021	2025	Reference (PPWSA)
Number of total staff	No.	2,173	2,232	2,117	2,208	N/A
Number of younger staff	No.	1108	1210	1,443	1,659	N/A
Number of turnover of total staff	No.	238	169	143	160	N/A
Number of turnover of younger staff	No.	185	111	118	140	N/A
Turnover ratio of total staff	%	10.95	7.57	6.74	7.24	1.0*
Turnover ratio of younger staff	%	16.70	9.17	8.17	8.42	2.3~1.2

*The value of PPWSA is assumed turnover rate for all staff age indicated in financial statement 2018. Detail estimation is 2.3% for staff with age 20-24, 1.8% for age 25-39, and 1.2% for age 30-34, respectively.

*Due to the data availability, the numbers of younger staff in 2017 and 2018 are the numbers of non-permanent staff.

*Assumption for projection:

- Total number of younger staff is based on the projection for 10 years as shown in Figure 2-4.
- Turnover rate of training participants is estimated as low as 7.14% while overall turnover rate of non-permanent staff is 13.31% according to the survey result. This retention effectiveness of training is assumed to last for 5 years.
- Trainings are provided to 200 staff members annually according to the training implementation schedule as shown in Chapter 8.
- By some measures to retain younger staff proposed in Chapter 8, current turnover of younger staff is expected to decline by 20%.

2) Promotion ratio (promoted staff in a year / total staff)

This PI can be interpreted that to what extent all staff can feel the improvement of their working treatment. Promotion ratio is calculated with a formula of; promoted staff in a year/total staff at the end of the year (based on a calendar year).

Table 9-6: Present and future target of promotion ratio

KPI	unit	2017 (actual)	2018 (actual)	Scenario A		Scenario B	
				2021	2025	2021	2025
Number of permanent staff	No.	1,028	1,003	1,253	2,101	-	-
Number of non-permanent staff	No.	1,217	1,195	855	78	-	-
Total staff number	No.	2,245	2,198	2,108	2,180	2,108	2,180
Promotion within permanent staff	No.	19	103	145.40	291.24	-	-
Promotion from Non-P to Permanent	No.	519	2	185.43	185.43	-	-
Promotion from Non-P to Non-P	No.		-	N/A	N/A	-	-
Total promotion	No.	538	105	331	476.67	-	-
Promotion ratio within permanent staff	%	1.85	10.27	11.60	13.86	-	-
Promotion ratio from Non-P to Permanent	%	42.65	0.17	21.69	236.28	-	-
Promotion ratio from Non-P to Non-P	%			-	-	-	-
Total promotion ratio	%	23.96	4.78	15.69	21.87	14.47	14.47

*Assumption for projection:

Scenario A is based on the proposed number of staff by level as shown in Table 8-3.

Scenario B is based on the past promotion trend in last 2 years;.14.47%

3) Staff composition by educational background

This PI shows the degree of education of the future core staff. To increase working productivity, it is better to increase the number of staff with higher education.

Table 9-7: Present and future target of staff composition by educational background

KPI	unit	10/2019		10/2022		10/2026		Reference (PPWSA)
		Non-P	Perman ent	Non-P	Perman ent	Non-P	Perman ent	Total
Doctoral Degree	%	0	0	0	0	0	0	0.2
Master Degree	%	0.3	0.9	0.3	1.0	0.3	1.2	4.9
Bachelor Degree (engineer)	%	8.3	3.9	8.3	3.9	8.3	3.9	28.7
Bachelor Degree (other)	%	21.0	24.5	24.3	28.3	29.6	34.4	
High school graduate	%	11.4	6.8	11.4	6.8	11.4	6.8	30.3
Incomplete high school and below	%	58.9	63.9	55.6	60.0	50.4	53.6	35.9
Total	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Assumption for projection: Because younger staff of high school graduate and bachelor degree of receive the support in work place, in addition to the elder staff's retirement, 5% of those staff group is expected to raise their educational background annually.

9.5 Further suggestions to improve productivity

This plan proposes many activities to strengthen EDWS in terms of human resource management. However, only improvement of HRM cannot realize the increase of productivity of entire EDWS. To enhance productivity, it is necessary to consider innovative measures from the wider perspective. Some suggested items are as follows:

- Set-up of responsible section/unit for innovation works
- Fundamental improvement of working procedures
 - Promotion of PC utilization in whole organization
 - Abolishment of billing collection at customer's door
 - Collection of bills bimonthly
 - Concentration on core duties by PPP practice
 - Reduction of workforce by abolishment of tube-well
- New introduction and innovation of technology
 - Improvement of efficiency of internal communication by setting up of intranet.
 - Introduction of SCADA system in WTPs, P/Ss, transmission and distribution management
 - Significant improvement of efficiency of meter reading and billing works by introducing ICT technology
- Human resource management
 - Regard non-permanent staff employment as probation period
- Establishment of firm autonomy
 - Financial management
 - Personnel management
 - Planning and management of utility works

Annex-3.E: Future Vision of Customer Service Section (Draft)

Future Vision of Customer Service Management Section (Draft)

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I. Introduction

Yangon is a central city with a concentration of 5.21 million people. About 37% of the population of Yangon City is supplied by the Yangon City Development Committee (YCDC), which is in charge of water supply development in Yangon City. In recent years, the city of Yangon has undergone rapid economic development, and in order to meet the rapid increase in water demand due to population growth and the development of commerce and industry, the improvement of water supply has become an urgent issue. In addition, the non-revenue water rate in Yangon City is analyzed to reach 66%, and the water tariff is kept low, so the water tariff income is not sufficient.

Even in water supply management, there are no written plans and standards, and projects are not implemented in accordance with standard operating procedures (SOP), etc., and quantitative performance evaluations using business indicators and business improvement based on them are also performed. Not done. In addition, financial management to secure appropriate income is also insufficient, and it is not always sufficient in terms of human resource development, public relations and customer service.

Therefore, in order to secure a sustainable water supply service, it is necessary to strengthen the organizational capacity of YCDC in parallel with facility development.

Looking at the customer service relationship among them, the fee collection work done at the T/S office is very inefficient, and the work at each T/S is not uniform, there are many problems in terms of fairness to customers. In addition, the Department of Water Sanitation did not have a department in charge of the agency work at the main office, and there was no department to lead improvement efforts.

To solve these problems, the Customer Service Division has been established under the guidance of JICA experts and the organization and division of affairs have been improved. In addition, efforts have been made to develop a "customer management/ fee collection system", standardize the meter reading work and fee collection work, and create a manual. And these efforts have just taken a step toward the modernization of customer service.

In the future, it is required to further develop this, aiming at efficiency and quality improvement of work, NRW reduction, and improvement of customer service.

This "Future Vision of the Customer Service Management Section (CSMS) " shows, as an example, its ideal situation and efforts toward the collection service of the CSMS and the modernization of the customer service. While referring to the advanced cases of Tokyo, which has continued to make corporate efforts to improve work efficiency, improve customer service, and improve work.

It should be noted that the review of the business management method is limited to a part of the outsourcing of meter-reading work, and the future concept focuses on efficiency improvement such as mechanization of work processing and improvement of work quality.

Originally, the review of the business management method could be carried out in an integrated manner, including in terms of hardware, but here it is handed over to the management department and the idea is from the customer service department.

II. Goals in the future vision, Ideal situation of the Customer Service Management Section and main efforts

The ultimate goals of the “Future vision of the CSMS”, and ideal situation and main efforts of the CSMS toward this are as follows. These will function organically.

<< Goal >>

• Improvement of management ability	• Reduction of NRW	• Improvement of customer satisfaction
-------------------------------------	--------------------	--

«Ideal situation of the Customer Service Management Section and main efforts»

Ideal situation of CSMS	Main efforts
1. A modernized fee collection system is operating and efforts are being made to further improve it.	Elimination of manual work for meter reading and income collection
	Online network systemization
	Introduction of smart meter reading, etc.
2. Improvement of leadership of Customer Service Management Section	Promotion of work manual creation
	Enhancement of statistical materials
	Support for T/S and work guidance, etc.
3. Various improvements have been made to the fee collection work	Bimonthly meter reading
	Outsourcing of work to the private sector
	Consolidation of T/S, etc.
4. Customer service is being further improved	Information provision, reception and PR using the Internet
	Diversification of payment methods
	Call center establishment, etc.

III. Image of future vision of Customer Service Management Section

EDWS Customer Service Management Section Future Vision

Vision of the Customer Service Management Section	Stage 1 (Batch processing)	Stage 2 WEB (online/real-time processing)	Stage 3 (Smart)
	Up to 2020	From 2021 (first half)	Around 2024 ~ (late)	Around 2027 ~
1. A modernized fee collection system is operating and efforts are being made to further improve it. (Meter reading work)	<ul style="list-style-type: none"> New database system (Phase 1) Meter reading ledger (Handwriting → F・B Created by New database system) YAPA.1 	<ul style="list-style-type: none"> Online system for fee collection New database system(Phase 1) Full-scale implementation and implementation (Phase 2) Expansion of PC installation and networking Introduction of handy terminal (By smartphone) Introduction of on-site issuance of notification bill Drive by (AMR) 	<ul style="list-style-type: none"> Cooperation and sophistication from meter reading to water distribution operation Introduction of mobile meter reading (For difficult places) Network communication (AMI) Introduction of smart meter reading (full-scale introduction)
2. Improvement of leadership of Customer Service Management Section	<ul style="list-style-type: none"> Establishment of Customer Service Division Preparation of manuals for meter reading and fee collection 	<ul style="list-style-type: none"> Preparation of manuals for fee collection work, non-payment management work, statistical work, etc. (Phase 2) T/S office supervision and support Collection and utilization of statistical data Enhancement of manuals for meter reading and fee collection 	<ul style="list-style-type: none"> Introduction of smart meter reading (For large users, apartments, etc.)
3. Various improvements have been made to the fee collection work	<ul style="list-style-type: none"> Bimonthly meter reading (one T/S) 	<ul style="list-style-type: none"> Bimonthly meter reading (full-scale) Abolition of on-site collection system T/S integration (first stage) Downtown area 	<ul style="list-style-type: none"> Promotion of outsourcing of T/S operations to the private sector T/S integration (secondary)
4. Customer service is being further improved	<ul style="list-style-type: none"> Cash collection Notification bill 	<ul style="list-style-type: none"> Introduction of direct debit Introduction of mobile payment Introduction of convenience store payment Use of the Internet (official Twitter, Facebook, Instagram) 	<ul style="list-style-type: none"> Introduction of direct debit (expansion) Introduction of credit card payment Establishment of call center “Line Pay” “Pay B” in Japan

(Explanation)

1. Stage of development

It is assumed that customer service will develop through the stages shown in the table below.

Stage of development	Explanation	Period
Stage 1 (batch processing)	From the update of customer information to the information management of non-payers, it is the time when most of the fee collection work is done mainly by the batch processing system.	Up to 2020
Stage2 WEB(online/real-time processing)	It is a time to develop (first period) or enhance (second period) business processing centering on online systems for most of the fee collection work from inquiry of customer information to information management of non-payers.	From2021(first period) From2024 (second period)
Stage 3 (Smart)	A water smart meter is a water meter that has a bidirectional network function and is a system that collects and analyzes data such as water usage and supports decision making. In addition to this, in the sophistication of water supply operation management (smartization), sophistication from meter reading to water distribution operation, as well as the accumulation of basic data of water supply business operation, problem solving and utilization of data will be done.	From2027

2. Ideal situation of the Customer Service Management Section and specific efforts

The following table describes the specific efforts.

Ideal situation of CSMS	Specific efforts	Explanation	Reference (introduction timing and aim in Tokyo, etc.)
1. A modernized fee collection system is operating and efforts are being made to further improve it.	Online system for fee collection	Full-scale implementation of the new database system (new D/B system) (Phase 1), construction and implementation of the new D/B system (Phase 2) to inquire and update customer information, issue invoices at any time, etc. It is possible to directly perform the processing of T/S. In addition, transmission/reception of meter-reading-related information and updating of fee income information can be processed online and in real time.	1986 Introduction of online collection system · Simplify and speed up collection office work

Ideal situation of CSMS	Specific efforts	Explanation	Reference (introduction timing and aim in Tokyo, etc.)
(Meter reading work)	Introduction of handy terminal (By smartphone)	<p>The fee for the current month is automatically calculated on the spot, and the notice slip is output from the printer. This will improve customer service, save labor in meter reading, and improve accuracy.</p> <p>By expanding the functions, it is possible to do the following.</p> <ul style="list-style-type: none"> • Use the slave unit and the wireless master unit on the handy terminal side to realize mobile meter reading. As a result, it is possible to perform "one-shot meter reading" for apartment houses and other apartment buildings, and to revisit difficult meter reading points or calculate based on the estimated usage amount. • Communication between the handy terminal and the host computer is possible from a remote location, and it is possible to send and receive meter reading data and customer data. 	<p>Introduced in 1993</p> <ul style="list-style-type: none"> • To deal with the problem of having two days off per week and difficulty in securing key punchers • Also, this has made it possible to properly and speedily perform business processing.
	Introduction of on-site issuance of notification bill	<p>For customers who pay by a bill, at the time of meter reading, it is possible to issue a bill with the notice of the fee (meter reading slip) locally.</p> <p>If the meter cannot be read on the day of meter reading or if the billing address is specified, a bill will be sent by mail. The effects are as follows.</p> <ul style="list-style-type: none"> • As a cost reduction, the shipping cost of the bill will be reduced. • For the improvement of work efficiency, there will be no work/procedures related to sending bills. • As for improving customer service, payment period can be taken longer than before. Also, the storage rate is improved. 	<p>Introduced in 2007</p>
	Introduction of smart meter	<p>The smart water meter is a water meter that has (1) a bidirectional network function, and (2) a system that collects and analyzes data such as water usage and supports decision making. In addition to</p>	<p>From 2010</p> <p>Introduction of mobile meter reading (57,000)</p>

Ideal situation of CSMS	Specific efforts	Explanation	Reference (introduction timing and aim in Tokyo, etc.)
	reading	<p>automating meter reading, it also contributes to strengthening the foundation, business continuity and customer service.</p> <p>On the other hand, there are issues for cost reduction, such as (1) technological development for cost reduction, (2) standardization of new standards for water meters, and (3) cooperation with other fields such as electricity and gas are essential. Therefore, it will be introduced gradually while accumulating know-how and experience.</p> <p>Specifically, first, the AMR method is used to eliminate the revisit meter readings for difficult meter readings and the calculation based on the estimated usage amount, and then the AMI method is used for large-scale customers such as factories and collective meter reading of apartments. It is appropriate to proceed in the order of smartization.</p> <p>AMR (Automated Meter Reading) A remote meter reading function with one-way communication such as mobile meter reading from an automobile.</p> <p>AMI (Advanced Metering Infrastructure) In addition to interval meter reading by two-way communication, "Advanced or Smart Meter" that enables more information and data storage, and the entire information collection and management system including communication network. This is a smart meter in a broad sense.</p>	<p>units)</p> <p>From 2014 to 2016 Demonstration experiment</p> <p>From 2020 Joint meter reading with TEPCO and Tokyo Gas started (about 6,000 units) Conduct a demonstration experiment to install 100,000 units by 2024</p>

Ideal situation of CSMS	Specific efforts	Explanation	Reference (introduction timing and aim in Tokyo, etc.)
2. Improvement of leadership of Customer Service Management Section	Creating of work manuals for Phase 2	<p>Create manuals for the three tasks, "income clearing work", "payment management work" and "statistics work" planned in Phase 2 of the new D/B system development.</p> <p>It also includes revision of the manual and SOP accompanying the release of the new D/B system (Phase 1).</p>	<p>From 1972</p> <p>Introduction of income system</p> <ul style="list-style-type: none"> • To respond to the shortening of staff working hours
	T/S office supervision and support	<p>《T/S office supervision and support》</p> <p>In order to properly carry out the work based on the work manual, etc., first, secure and train the staff who are instructed and supervised by securing staff who are familiar with T/S work.</p> <p>Next, based on the results of analysis of unmeasured needles and unpaid information, set guidance targets and formulate a visit guidance plan, and conduct visit guidance on a regular and occasional basis.</p> <p>《Training of T/S staff》</p> <p>Create training materials based on syllabus, curriculum, and manuals for the purpose of improving work quality. In addition, guidance, training, holding study groups on business cases, and presentations on business improvement cases will be held.</p> <p>《Supporting T/S staff to solve problems》</p> <p>Mainly as a support for appropriate resolution of difficult problems, by establishing a support system of the headquarters, such as setting up a person in charge for each task, the solution and guidance to difficult and exceptional cases can be flexibly and at any time. .. At the same time, a problem case database and problem reporting system will be developed.</p> <p>《Support T/S office to reduce non-payment》</p> <p>As a support to improve collection rate, a progress management meeting will be held every month, and regular or occasional visit guidance will be provided for</p>	

Ideal situation of CSMS	Specific efforts	Explanation	Reference (introduction timing and aim in Tokyo, etc.)
		early response such as unread meter and for long-term and high-payment management.	
	Collection and utilization of statistical data	<p>With the construction of the new D/B system (Phase II), statistical information will be enriched with basic information such as the number of water supplies, amount of water used, water charges, etc., as well as basic income information and unpaid information.</p> <p>In addition, management information for T/S instruction such as unread meter, abnormal meter, water leak of water supply device, information of non-payment, etc. can be enhanced.</p> <p>As a result, not only is the business management information enriched, but by strategically utilizing this information, it is possible to more actively promote improvements in the storage rate, business improvement, service improvement, and the like.</p>	
	Enhancement of manuals for meter reading and fee collection	In the meter-reading works and the fee collection works, there are various kinds of events that actually occur in the field. It is necessary to organize this systematically and enhance it to a level that can withstand training materials for new hires and specifications for outsourcing work to the private sector in the future. In addition, this will also contribute to ensuring fair and high-quality business execution through proper calculation of fees.	<p>1950</p> <p>Preparation of "Fee collection work manuals"</p>

Ideal situation of CSMS	Specific efforts	Explanation	Reference (introduction timing and aim in Tokyo, etc.)
3. Various improvements have been made to the fee collection work	Adoption of Bimonthly meter reading system	<p>Bi-monthly meter reading will be introduced for the purpose of reducing the number of meter readers and the cost of collection.</p> <p>The area is divided into two, and meter reading is performed once every two months. Generally, the meter-reading area is divided into an odd-numbered month meter-reading area and an even-month meter-reading area, and the meter-reading is alternately performed.</p> <p>The merit includes the reduction of expenses by halving the collection related office work (meter reading, fee calculation, collection), reducing the number of meter readers and reviewers, and reducing the delivery notification by half (paper, printing, postage cost saving). To be On the other hand, there will be problems such as doubling of the amount of one-time bills, temporary increase in the number of non-payments/charges, increase in water leakage, and increase in water quantity increase/decrease survey work, which are disadvantages. Therefore, it is necessary to introduce it while taking measures against this.</p>	<p>From 1968 6-month meter reading system adopted</p> <ul style="list-style-type: none"> • For reconstruction of water supply finance <p>From 1983 4-month meter reading system adopted</p> <p>From 1995 Bi-monthly meter reading system adopted</p>
	Abolition of on-site collection system	<p>The on-site collection system will be abolished by diversifying payment methods such as direct debit and storage at convenience stores. As a result, the status and treatment of collection staff will be improved, labor costs will be reduced, work efficiency will be improved, and money will not be transferred, thus preventing fraud.</p>	<p>1974 abolished</p> <ul style="list-style-type: none"> • To improve the status and treatment of the collection staff (about 250 people)
	T/S integration (Customer service work) (Final	<p>Since the management span of T/S customer service work will increase due to the progress of systemization, it will be possible to handle a wider area with one T/S.</p> <p>Also, by integrating T/S, surplus manpower can be effectively directed to T/S in areas where the number of hydrants is increasing. . .</p>	<p>1986 Consolidation of some customer service offices in the ward area</p>

Ideal situation of CSMS	Specific efforts	Explanation	Reference (introduction timing and aim in Tokyo, etc.)
	target: 33 T/S ----> 20 T/S)	The integration of T/S is triggered by systematization, outsourcing of operations to the private sector, and the establishment of call centers.	by online collection (33 offices ----> 31 offices) Currently 21 offices (Number of water supply in ward area: Approximately 5.7 million)
	Promotion of outsourcing of T/S operations to the private sector	<p>Promote outsourcing to the private sector while training private sector operators in order to further improve work efficiency.</p> <p>First of all, outsource the meter reading work of the water meter, and then proceed from a part of the collection and collection work to T/S work in general.</p> <p>In this way, the scope of outsourcing will be gradually expanded from simple tasks to more difficult tasks.</p> <p>It should be noted that the outsourcing of meter-reading work needs to be carried out while maintaining consistency with the smartization.</p>	<p>From 1980</p> <p>Commenced outsourcing of meter reading business (a part of about 350 people in meter reading)</p> <ul style="list-style-type: none"> • In order to respond to the increase in the number of employees due to the new recruitment of internal relocation and the increase in the number of water taps

Ideal situation of CSMS	Specific efforts	Explanation	Reference (introduction timing and aim in Tokyo, etc.)
4. Customer service is being further improved	Introduction of direct debit	<p>Direct debit, which is one of the methods of paying utility bills, is an effective and most reliable method of payment in order to prevent forgetting payment and delinquency.</p> <p>Since the administrative expenses are lower than payment, payment of water charges by direct debit may apply a direct debit discount. There is also an example of introducing a service that specifies the date of direct debit.</p>	Introduced in 1967
	Introduction of mobile payment	<p>It is a service that pays water and sewerage charges by scanning the barcode of the delivery notification issued by the Waterworks Bureau using the camera of a mobile terminal such as a smartphone that has a dedicated app installed for each company.</p> <p>It is possible to make payments using electronic money, and cashless payments can be performed from home as well as anywhere with simple operations.</p> <p>Other than that, there are similar systems such as "M-PESA service" in Kenya.</p>	Introduced in 2019
	Introduction of convenience store payment	<p>This is a way for billing customers to bring their bills to convenience stores and pay. They can make payments at convenience stores regardless of time or day of the week.</p>	<p>Introduced in 1998</p> <ul style="list-style-type: none"> • To respond to residents' requests accompanying changes in lifestyle (24-hour city)
	Use of the Internet	<p>Introduced a service for providing information on customer usage results</p> <p>This is a free membership registration service that allows customers to check their water usage, etc. on their PCs and smartphones.</p> <p>With the content confirmation function of the</p>	Introduced in 2003

Ideal situation of CSMS	Specific efforts	Explanation	Reference (introduction timing and aim in Tokyo, etc.)
		<p>"Notification sheet for water usage, etc." (meter reading sheet), the contents of the meter reading sheet posted at the time of meter reading can also be confirmed on the Internet.</p> <p>In addition, the function of confirming past usage record information allows the customer to check the past several years in a list of water usage and charges. . .</p> <p>Abolishing the "Notice Sheet for Water Usage, etc." will greatly contribute to making paperless.</p>	
		<p>Establishment of mobile phone homepage and start of official Waterworks Bureau Twitter, Facebook, Instagram</p> <p>In addition to the regular website, a website for mobile phones will be opened and official Twitter, Facebook, and Instagram of the Waterworks Bureau will be launched.</p> <p>(Twitter)</p> <p>It is not a reply to this account and a response to a direct message, but it is to retweet what is judged to be necessary among tweets conducted by a highly public organization such as the national government and local public bodies.</p> <p>(Facebook)</p> <p>The purpose is to improve the image of the water supply work operated by the Water Works Bureau, cultivate a sense of trust in tap water, and deepen understanding of the water supply work. On this page, information and other information published by the Waterworks Bureau and related organizations will be posted.</p> <p>(Instagram)</p> <p>This account is operated for the purpose of raising interest in the water supply work and promoting understanding.</p>	<p>Introduced in 2004</p> <ul style="list-style-type: none"> • Improve the image of water supply business, cultivate a sense of trust in tap water, and promote understanding of the Water Works Bureau's business.
	Introduction	Credit card payment is a method of pre-registering and	Introduced in

Ideal situation of CSMS	Specific efforts	Explanation	Reference (introduction timing and aim in Tokyo, etc.)
	of credit card payment	<p>paying the water charge continuously with a credit card every time, and the credit card company makes advance payments to the Waterworks Bureau on behalf of the customer. The credit card company charges the customer the amount paid in advance as the payment for using the credit card.</p> <p>Since the fee paid to the credit card company is a considerable burden, it is necessary to carefully consider the introduction.</p>	2007
	Establishment of call center	<p>The purpose is to improve the convenience of customers and improve the efficiency of office work by batch processing. This is an inbound call center system that handles incoming calls from customers such as complaints. Due to the large number of telephone calls, the call center system has the following functions, which are very effective.</p> <ul style="list-style-type: none"> ● ACD (Automatic Call Distribution) This prevents over-deployment of personnel and reduces labor costs. ● IVR (Interactive Voice Response) Automatically accept and respond by dialing the caller. With this function, it is possible to understand the state of the customer to some extent in advance, and it is possible to improve customer responsiveness and improve efficiency. ● Know customer information in advance by screen pop-up By linking with the number display, the information of the customer who is the other party of the call is displayed on the screen at the same time as the incoming call. In addition, it is a great merit of introducing a call center system that the quality of correspondence can be made uniform. 	<p>Introduced in 2005</p> <ul style="list-style-type: none"> • Realization of one-stop service (stop, start, name change, charge inquiry), and solution of issues such as flexible business response during busy periods and off-seasons

IV. Immediate schedule for realization of "Future vision of the Customer Service Management Section " [Stage 2 (online) 2021 to 2023 (first half)]

According to the attachment “Current Schedule for Realizing Future Vision of Customer Service Management Section”

(Explanation)

In order to strengthen the organizational capacity of YCDC's Customer Service Management Section, the efforts have been prioritized as shown in the right figure “Customer Service Management Section 's administrative division”.

Since these are important measures for solidifying the foundation for the realization of the future vision of the Customer Service Management Section, it is necessary to steadily realize them.



For this reason, in the “immediate schedule for realizing the future vision of the Customer Service Management Section”, the same classification is used as a schedule to be tackled.

1. Items that have been implemented and will be fully implemented and expanded

- Operate Customer Data and Billing system
- Improve work process to be efficiency

2. Items that have been prioritized and will be promoted and improved

- Make Manuals and Guidelines and revise them
- Conduct meetings for T/S staff
- Collection and Provide Statistics and Data

3. Items to be planned as the next step

- Supervise and support T/S office

- Conduct training for T/S staff
- Support T/S staff to solve problems
- Support T/S office to decrease non-pay
- Implement Coordination with other Divisions

In parallel with these, new work improvements such as the introduction of a handy terminal for meter reading and integration of T/S listed in "Image of the Future Vision of the Customer Service Management Section " are scheduled as "other planned actions". To do.

V. To modernize customer service

In order to modernize the customer service of EDWS, there are many things that should be done, such as modernizing the fee collection system, improving the leadership of the customer service department, and improving and streamlining operations.

This "Future Concept of the Customer Service Management Section" focuses on the advanced cases of Tokyo, which has continued to make steady efforts to improve business efficiency, improve customer service, and improve business. Today, efforts that took 10 years in the advanced cities can be realized in a few years, greatly shortening the period.

That said, the road is still long and steep. In any case, it is to steadily realize each step by step.

There are various possible ways to reach this goal, but it is essential that all the organizations work together at a pace and in a way that suits this country while continuing to refer to advanced cases.

