



# **OPERATIONS MANUAL**

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## **DINGRAS WATER DISTRICT**

**ILOCOS NORTE**

**A manual containing the general information about the agency, its underlying function, mandates, operating procedures and organization standards**

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## INTRODUCTION

This operations manual has been prepared by Dingras (IN) Water District to provide general information about the agency, its underlying function, and mandates, operating procedures and organization standards and adopting the LWUA Commercial Practices Manual for Water Districts.

The manual is divided into several parts, as follows:

*Introduction*– This section contains the purpose of the manual and its parts.

*Definition of Terms and Acronyms* – This section contains the definition of various terms and acronyms to be used throughout this manual.

*General Information about the Agency*- This section contains the company profile, such as the brief history of DWD, mandates and functions, its mission and vision, pumping stations and areas of operation.

*Organization and Responsibilities*–This section contains the organizational structure of the District as well as the duties and responsibilities of every department and individual position.

*Operating Procedures*–This section contains the step-by-step procedures and work instructions of DWD in terms of water production and distribution, administration and financial aspects and the commercial aspects. Activity flow charts are used to illustrate the different processes involved in daily operations.

*Appendices* – This section contains the supplementary material that contains statistics, forms and other mention in this manual.



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## DEFINITION OF TERMS AND ACRONYMS

**DWD** – *Dingras (IN) Water District*

**LWUA** – Local Water Utilities Administration, is a government-owned and controlled corporation (GOCC) with a specialized lending function mandated by law to promote and oversee the development of water supply systems in provincial cities and municipalities outside of Metropolitan Manila

**GOCC** – Government Owned and Controlled Corporation are corporations created or established by a special charter or law in the interest of the common good and subject to the test of economic viability.

**CSC** - Civil Service Commission is an impartial, independent appellate board that hears and decides appeals filed by certain state and municipal civil service employees and candidates seeking public employment.

**BOD** – Board of Directors of a water district is comprised of five (5) members from different sectors (Professional, Education, Civic, Women and Business) that are appointed by the Municipal Mayor or by the power of a resolution whichever is applicable, who jointly oversee the activities of the Water District.

**COR** – Collector's Official Receipt is a written acknowledgement that shows money has been received as partial or full payment of bill for water consumptions.

**PNSDW** – Philippine National Standard for Drinking Water

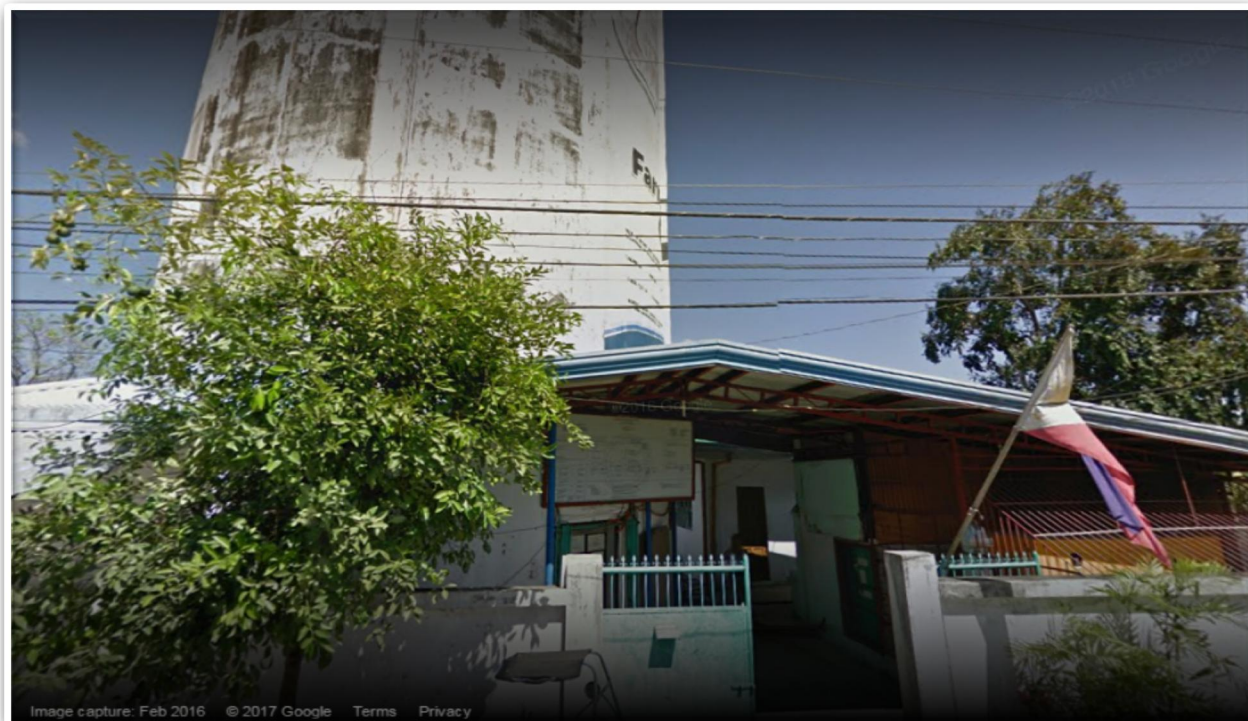
**DOH** – Department of Health

**O&M** – Operation and Maintenance

**NRW** – Non-Revenue Water



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## GENERAL INFORMATION ABOUT DWD

A water district is a special local corporate entity given the task of supplying water and sewer needs through operating and maintaining a water supply system in one or more provincial cities or municipalities. It is established on a local option basis and, like the Local Water Utilities Administration (LWUA), it is classified as a government-owned and controlled corporation or GOCC. It is run by a five-man Board of Directors through a General Manager.

Dingras (IN) Water District was created on June 8, 1982, thru a public hearing under the Administration of the Local Water Utilities Administration. The Water District started its operations on the same date with 151 to 673 initial concessionaires, where its operation is governed by PD 198, otherwise known as the "Provincial Water Utilities Act of 1973" as amended under the Presidential Decree No. 768 and 1479. The decree authorized the formation of Local Water Districts and provided for their



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government and administration to facilitate improvement of local water utilities and granted said administration such powers which are necessary to optimize public service from utility operations and for other purposes. Currently, it is serving eighteen (18) barangays of the Municipality of Dingras and Marcos, Ilocos Norte with almost 1744 active concessionaires as Of December 2015.

The Water District is managed through policies, formulated by its Board of Directors, in accordance with the regulations imposed by the LWUA, National Government and other regulatory bodies.

## A. VISION

Our vision is “to be able to give prompt and polite service to all concessionaires with a 24 hours readiness”.

## B. MISSION

The Dingras Water District dedicated to provide clean, potable accessible, sustainable, sufficient and affordable water service in its area of coverage, financially viable organization affecting concessionaire’s full satisfaction.

## C. CORE FUNCTION

The Dingras Water District is an organization that is composed of honest and resourceful employees with a sense of dynamic responsibility dedicated to and understanding the water needs of the society.

The Water District has set forth this character as an assurance to concessionaires, when applying for a new connection for the first time, to all valued customers who are availing the water service, since its creation, and to state their respective obligations with the aim of granting full customers’ satisfaction, step by step procedure in availing water service, and guaranteed performance as scheduled in the availability of service in the application for new connections.

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Dingras (IN) Water District is dedicated and committed to its mission - developing everyday towards fulfilling its vision of providing an abundant supply of potable water to every resident of the town of Dingras and Marcos.

The District's primary objective is to supply potable water, which will meet the domestic demands through the creation, operation, maintenance and expansion





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of reliable and economically viable and sound water supply within the Municipality of Dingras and Marcos.

As water is a basic need, Water Districts around the country have always been true in their dedication to provide safe and potable water to consumers. However, providing quality water to consumers is not just what it takes to maintain the trust and loyalty of the customers. With the trust the Civil Service Commission has always directed to the Government Offices and Water Districts the aim to provide service directed to excellence as a part of commitment to the public.

## D. GENERAL

### I. ADMINISTRATIVE

Dingras Water District was created by virtue of PD 198 as amended by PD NO 768 and 1479, under the Republic Act 9286, and was formed by the Sangguniang Bayan under the leadership of the late Mayor Napoleon Foz under Resolution No. 59 series of 1982 with the Conditional Certificate of Conformance (CCC) 208 issued on August 6, 1982. The Dingras Water District composed of five members of the Board of Directors from the different sectors of organization in Dingras in order to enable the district's financial assistance, technical, and management advisory assistance from Local Water Utilities Administration for the creation of plantilla positions on the operation of the District. The positions created under the Dingras Water District are General Manager, Senior Accounting Processor B, Customers Service Assistant E (2), Water Resources Facilities Operator B, Plumber, and Utility Man(2). The Dingras Water District aims to upgrade the quality of services and to develop an adequate potable water supply in the locality. All facilities of the original Dingras Water System which was un-operational was turned over to the Dingras Water District sometime in 1984 with the presence of the Local Water Utilities Administration (LWUA).

As of the present, DWD has two (2) overhead tanks: with a capacity of 60 gal at Brgy. Guerrero & 30 gal at Marcos. As for the ground tank, there are already three (3) existing: 2 which was located at Marcos (Fortuna and Valdez) and 1 at Dingras (Brgy. Root).

### II. FINANCIAL/COMMERCIAL

As of present, the Dingras Water District holds a Joint Savings Account. The Dingras Water District active service connection is 1,744. There are 11 employees including casuals. The Dingras Water District maintains the practice on collection



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in the field and to enforce disconnection scheme to those concessionaires of two months and above, who have not yet paid their bills, without further notices as long as they receive their water bills issued by the customers service assistance officer, and they were given 15 days grace period after the issuance of their bills.

### III. TECHNICAL AND OPERATIONAL

The Dingras Water District serves 13 Barangay's in the service area of Dingras of which 6 Barangay's are urban and 7 are rural with the service area equivalent to 42% served and 4 Barangay's in Marcos which is equivalent also to 3.25%. The service total population served is 22,154 with an average of 5 persons/ per house hold. 70% of the total population is in the low income profile as their source of income is farming, 60 % of the customers are engage in farming and most of them are using minimum charge.

The Dingras Water District is in possession of 5 wells, their locations and specifications will be specified in the *Existing System Facilities* section of this manual. The Dingras Water District has 2 overhead tanks located in Barangay Guerrero with a capacity of 60,000 gallons. Below the overhead tank lies the administration office. The other overhead tank is the equity of the Marcos town as agreed in the memorandum of agreement that they are given equity to the expansion project equivalent to 40% of the total project cost. With the existence of the overhead tank the Water District also have a ground reservoir in Barangay Root with booster pump and 2 in barangay Marcos to augment the water supply for the continuous service even in the mountainous place. The Municipality of Marcos also provided a lot donated for the Dingras Water District for the construction of well and pump station. Furthermore, the transmission line from Marcos interconnected to Dingras in as much the capacity of the well in Marcos is more than the required needed of the concessioners to augment the pressure in Dingras with presence of immediate action and fast recovery of the operation.

The Dingras Water District conducts monthly bacteriological test and semi-annual physical chemical test to ensure potable and safety water precautions. Sometimes concessionaires complained on the quality of water provided, and low pressure problems especially during peak hours. The District technical men take immediate action to solve the problems as soon as possible to satisfy the concessionaires demand. The District is also presently undertaking massive inspection and disconnection to those who could not pay their water bills within 3 months and repair their water meter stand and old water meter stands since these are also the cause of non-revenue water. The Dingras Water District has its own facilities like jack hammer, concrete cutter welding machine and chain host to facilitate the work



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The mode of service of the Dingras Water District to facilitate travelling from the different pump station and from district office to the service area and going to Laoag City are tricycle and Topdown. The pump stations situated in different Barangays one in Barangay Fortuna, Valdez Marcos, Barangay Puruganan, Guerrero, Medina and Root in Dingras respectively and almost a kilometres away from each other and there are 3 pump operators assigned on a rotation of duty for dayshift and night shift to ensure that the capacity of the pumps or demand of the concessionaires are satisfied on a 24/7 service.

## ORGANIZATION AND RESPONSIBILITIES



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*This section discusses the Dingras Water District's organization and the responsibility of every division and staff.*

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# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

## A. ORGANIZATIONAL STRUCTURE

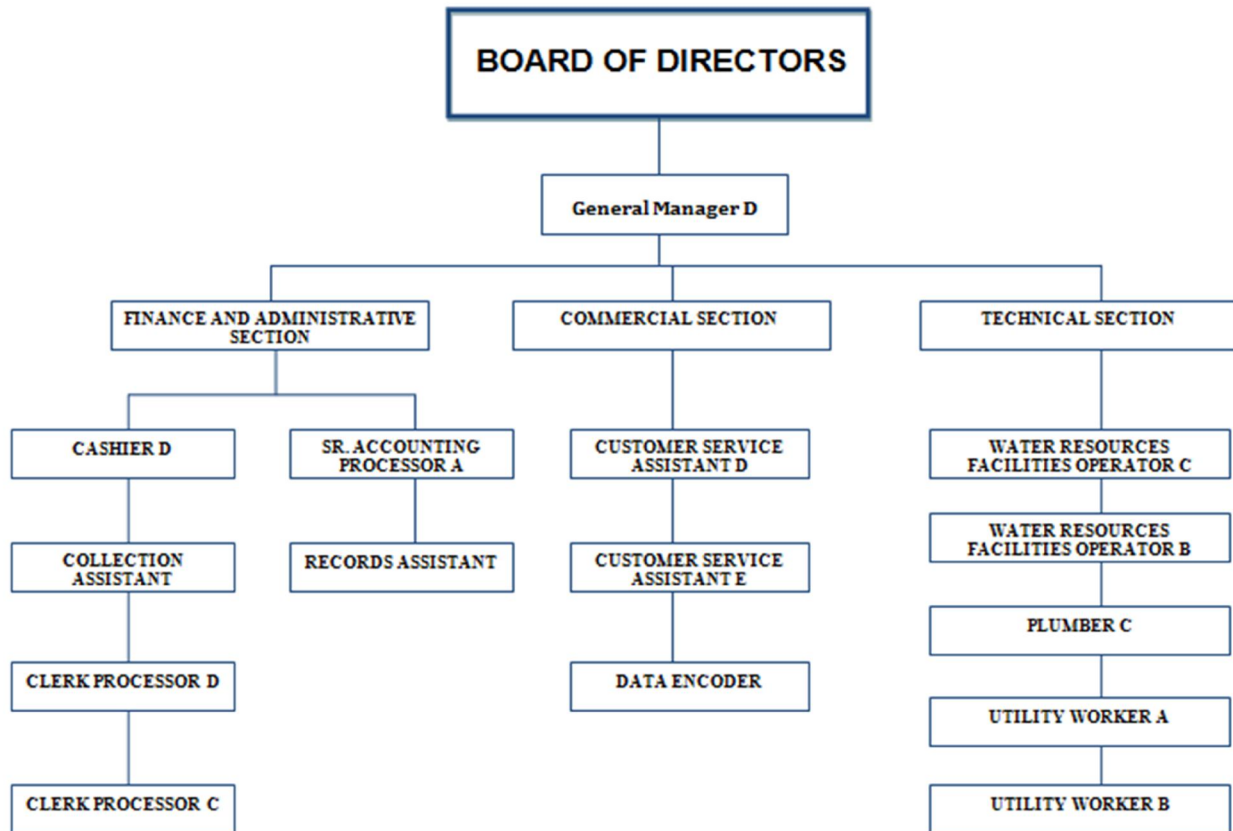


Figure 1 Organizational Chart

The Dingras Water District's organizational structure is divided into three divisions – Administrative and Finance, Commercial, and Engineering. The heads of each division reports directly to the General Manager who is primarily responsible for the management and performance of the water district, and who in turn reports to the Board of Director, the policy-making body of the water district.

## B. ROLES AND RESPONSIBILITIES

### I. BOARD OF DIRECTORS

- ✓ Establish policies
- ✓ Ensures the availability of adequate financial resources and approves annual budget.

### II. GENERAL MANAGER D

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

- ✓ Directs basic effort of all personnel toward achieving goals and objectives within established policies (90%)
- ✓ Performs administrative and other duties as required (10%)

In addition, the general manager The General Manager shall exercise operational control over the following duties:

- ✓ Regular conduct of staff and committee meetings.
- ✓ Preparation of agenda for Board meeting.
- ✓ Implementation of agency's policies, rules and regulations.
- ✓ Participation in district's activities with other organizations.
- ✓ Coordinates with Local Water Utilities Administration, Civil Service Commission and Commission on Audit with regards to projects, concerns, issues and other matters to avoid violations to any laws, policies and regulations.
- ✓ Secures 24/7 availability of water supply.
- ✓ Maintains operational records, printed out and save on a computer local disks and flash drives
- ✓ Machineries and supplies are check daily to avoid breakdowns
- ✓ Quick response to damaged water lines to avoid high percentage of water leaks do other duties assigned by higher authorities (15%)
- ✓ Strictly mandates the Republic Act No. 9485, known as the Anti-Red Tape Act
- ✓ Enhance transparency and enforce accountability, by maintaining a transparency seal in the website ([www.dingraswaterdistrict.gov.ph](http://www.dingraswaterdistrict.gov.ph)).
- ✓ Complies with Presidential Decree No. 198 (Provincial Water Utilities Act of 1973) and LWUA requirements.
- ✓ Water District employees joins Trainings and Seminars to develop, add knowledge about its duties and responsibilities
- ✓ Monitors transmission, distribution and fittings to track sources of the non-revenue waters
- ✓ Strictly follows the District Policies, Laws and Procedures.

### III. FINANCE & ADMINISTRATIVE SECTION

**Administrative Section** is responsible for general service, collection of water sales & disbursement of funds. It is in-charge of the procurement; assists in the implementation of special projects program. This section is also responsible for the recruitment and retention of highly qualified employees for the agency.

**Finance Section** is responsible for the recording and summarizing of financial transactions, preparation of Financial Reports and Inventory Management. Also responsible for the Budget Preparation and assist in allocation and distribution of budgets as wells as monitoring the budget performance. Commercial Services is responsible for providing customer services to the concessionaire, meter reading and billing. Assists in the recording and posting of payments and monitoring of the customer accounts. This section is also responsible in attending customer service requests and complaints. It is also in-charge in inspection and investigation regarding



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water connection.

## ***i. SENIOR ACCOUNTING PROCESSOR A***

- ✓ Maintains complete financial books relative to revenues, receipts and expenditure of the district (25%)
- ✓ Calculates and prepares payroll based on employee time sheet (25%)
- ✓ Prepares check vouchers, signs other financial transactions like purchase requisition, receiving reports & etc. (25%)
- ✓ Do other duties assigned by higher authority (25%)

## ***ii. CASHIER D***

- ✓ Receives cash from collectors and customers per collector statement (45%)
- ✓ Validates and reconcile accounts and deposit collection in the bank (45%)
- ✓ Do other duties assigned by higher authorities (10%)

## ***iii. RECORDS ASSISTANT***

- ✓ Assists in maintaining complete financial books relative to revenues, receipts and expenditure of the district (35%)
- ✓ Records installed service connection, meter reading card, customer ledger card & master list of service connections (25%)
- ✓ Assists the BAC Secretariat in preparing Resolutions and Minutes of BAC (20%)
- ✓ Provides assistance in managing office records, sends documents and files, and ensures that all documents are kept in order and in safety (10%)
- ✓ Do other duties assigned by higher authorities (10%)

## ***iv. COLLECTION ASSISTANT***

- ✓ Assists the cashier in receiving cash from collectors and customers per collectors' statement (45%)
- ✓ Assists the cashier to validate and reconcile accounts and deposit collection in the bank (45%)
- ✓ Do other duties assigned by higher authorities (10%)

## ***v. CLERK PROCESSOR C***

- ✓ Supervises the billing schedule (90%)
- ✓ Do other duties assigned by higher authorities (10%)

## ***vi. CLERK PROCESSOR D***

- ✓ Follow strictly the billing schedule (5%)
- ✓ Pre-address water bills not earlier than one day before reading date(20%)
- ✓ Forwards pre-addressed water bills to meter reader as scheduled (20%)
- ✓ Up-to-date posting of meter reading and penalty charges (5%)
- ✓ Prepares and forwards daily billing summary and water bills to the bookkeeper and bill collector respectively
- ✓ Through the designated person for checking (20%)
- ✓ Prepares m.o. for disconnection of delinquent accounts (5%)
- ✓ Up-to-date posting of receipts, collections and return of water bills (15%)
- ✓ Verifies consumption on consisted bills (5%)



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- ✓ Prepares billing adjustment memo on verified bills (5%)

## **IV. COMMERCIAL SECTION**

It is responsible for providing customer services to the concessionaire, meter reading and billing. Assists in the recording and posting of payments and monitoring of the customer accounts. It is also responsible in attending customer service requests and complaints. It is also in-charge in inspection and investigation regarding water connection.

### ***i. UTILITIES/CUSTOMER SERVICE ASSISTANT D***

- ✓ Monitors service application and construction order upon application by concessionaire (90%)
- ✓ Do other duties assigned by higher authorities (10%)

### ***ii. UTILITIES/CUSTOMER SERVICE ASSISTANT E***

- ✓ Process service application and construction order upon application by concessionaire (35%)
- ✓ Inspects proposed service location (25%)
- ✓ Records installed service connection, meter reading card, customer ledger card and master list of service connection (25%)
- ✓ Performs other related tasks (15%)

### ***iii. DATA ENCODER***

- ✓ Encodes data into the computer billing system such as meter reading and penalty charges (50%)
- ✓ Checks the data for basic errors or making sure that the data being entered is correct and in accordance with the procedures (35%)
- ✓ Do other duties assigned by higher authorities (15%)

## **V. TECHNICAL SECTION**

It is responsible for the installation of new service connections. Attending to the repairs and maintenance of water distribution lines and performing of major and minor plumbing services. This section is also in-charge in water system project implementation and constructions. It is responsible for the water maintenance and disconnection and reconnection of service lines. It is responsible for the following: operation & monitoring of pumping equipment, power equipment and water storage tank, disinfection of water supply, calibration of chlorine test instrument, water quality testing and monitoring, housekeeping and maintenance of pump house, ground and surrounding, equipment and other related production facilities, delivery of chlorine to pumping stations and material quality testing.

### ***i. WATER RESOURCES OPERATOR B***

- ✓ Operates production facilities exclusive of treatment plant (60%)
- ✓ Assigned in meter setting and disconnection (10%)
- ✓ Do other duties assigned by higher authorities (10%)



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

## ii. WATER RESOURCES OPERATOR C

- ✓ Operates production facilities exclusive of treatment plant (60%)
- ✓ Performs in minor maintenance and assist major task (20%)
- ✓ Assigned in meter setting and disconnection (10%)
- ✓ Do other duties assigned by higher authorities (10%)

## iii. PLUMBER C

- ✓ Performs semi-skilled routine tasks in construction and maintaining customer's service piping and other related tasks as directed (75%)

## iv. UTILITY WORKER A

- ✓ Performs General Services to the General Manager or other Utility task (50%)
- ✓ Performs General Maintenance and safe keeping of the office and Pump house (35%)

## v. UTILITY WORKER B

- ✓ Performs General Services to the General Manager or other Utility task (50%)
- ✓ Performs General Maintenance and safe keeping of the office and Pump house (35%)
- ✓ Do other duties assigned by higher authorities (15%)

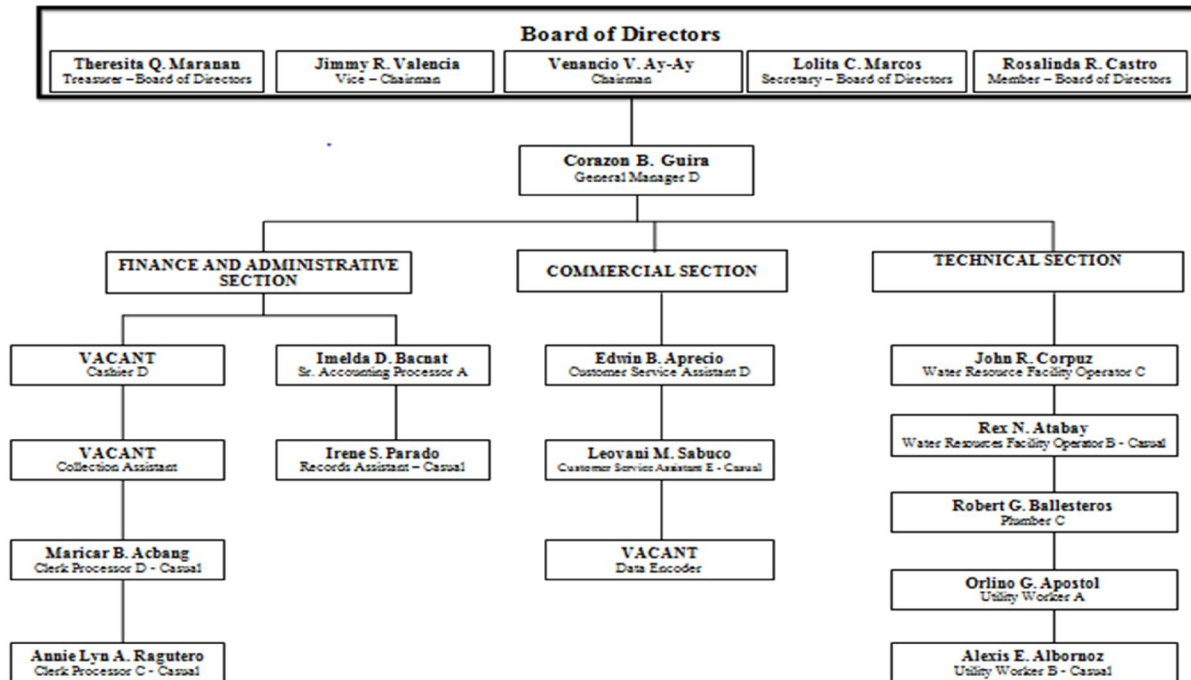


Figure 2 - Current Organizational Chart



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## C.UTILITY RULES

The utility rules of the water district have the following basic content:

- Requirements in Applying for Service Connection;
- Responsibilities of the Consumer;
- Tariff levels;
- Payment of Bills;
- Billing Adjustments;
- Fees for Other Services (reconnection, meter testing, etc.)
- Rule Infractions and Penalties

These rules are discussed further under the Operating Procedures in this manual for easy dissemination. This can help prevent future misunderstandings or conflict. Some of the contents, such as tariff levels and penalties will need Board resolutions or policies before management can implement them.

- Delivering Water Service 24/7

To ensure reliable service, the thrust in the maintenance of facilities should be, as much as possible, preventive. However, the water district should plan ahead and have ready responses for emergencies. The aim is to enable it, ideally, to provide continuous service even during emergencies. Where this is not possible, such preparation should seek to limit the duration of interrupted service.

- Importance of Collection Efficiency

Cash inflows are essential to enable the water utility to operate in a reliable and predictable manner. Thus, tariff levels are generally set to cover normal operation and maintenance costs, as well as to provide surplus funds to cover emergency requirements. However, regardless of how well designed the tariff structure may be, if bills are not collected, or are not collected on time, the water district will experience cash shortages that could compromise service levels. The water district must maintain collection efficiency of 94-96% to ensure that it has sufficient funds to finance its operations.

- Preserving the Health of the Community

The sole product of the water district is water and it is imperative

- Reducing Non-Revenue Water (NRW)



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## OPERATING PROCEDURES

This section provides a basic reference on the daily operations of the water district. It consists of Water Production & Distribution, Administration and Financial Aspects, and Commercial Operations

### A. WATER PRODUCTION & DISTRIBUTION

The Dingras Water District has existing water supply facilities that are composed of source and pumping facilities, transmission and distribution facilities, storage facilities and chlorinating facilities. The service area of the Water District covers six (6) barangays of the poblacion of Dingras; eight (8) adjacent barangays surrounding the Poblacion; and four (4) barangays in the Municipality of Marcos.

### B. SERVICE AREA DELINEATIONS AND COVERAGE

The Dingras Water District serves 1,934 concessionaires in fourteen (14) barangays in the Municipality of Dingras, namely: Parado, Medina, Guerrero, Dancel, Albano, Madamba, Purugunan, Peralta, Bungcag, Suyo, Saludaes, Cali, Root and Sulquiano.

The Dingras Water District also serves four barangays in the Municipality of Marcos (Lydia, Daquioag, Valdes, and Fortuna). Distribution lines are installed mostly on National, Provincial, Municipal, and some Barangay roads. The service area extends to about 20 meters from the center of the road on both sides.

#### AREAS OF OPERATION COVERED

	DINGRAS, ILOCOS NORTE	MARCOS, ILOCOS NORTE
	Brgy. Parado	Brgy. Lydia
	Brgy. Medina	Brgy. Valdez
	Brgy. Guerrero	Brgy. Fortuna
	Brgy. Dancel	Brgy. Daquioag
	Brgy. Albano	
	Brgy. Madamba	

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	Brgy. Puruganan	
	Brgy. Peralta	
	Brgy. Suyo	
	Brgy. Bungcag	
	Brgy. Saludares	
	Brgy. Sulquiano	
	Brgy. Root	
	Brgy. Cali	
<b>TOTAL</b>	<b>14</b>	<b>4</b>

Table 1 - Areas of Operation Covered



Figure 3 - Dingras



Figure 4 - Marcos

## i. Population and Water Demand

As of August 1, 2015, the fourteen barangays presently served by Dingras Water District has a total population of 18,803 with 3, 950 households.

## C.WATER RESOURCES

### I. SURFACE WATER RESOURCES

Dingras is the convergence of three big rivers in the eastern part of Ilocos Norte, namely, Padsan, Tina and Burnay Rivers.

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Padsan River is the largest and the main river that traverses the eastern towns of Ilocos Norte. It flows northward from the mountains in the Municipality of Nueva Era then turn northeast upon reaching Dingras. It zigzags its way to the town of Sarrat until it discharges to the West Philippine Sea in Brgy. La Paz of Laoag City. Tina River flows westward from the mountains in the Municipality of Solsona and joins the Padsan River at Brgy. Lumbad, Dingras. Burnay River flows northeast from Mt. Sicapoo in the Ilocos mountain range, east of the town of Marcos. It then joins the Padsan River and Tina River at Brgy. Lumbad.

The flow of each river is enough to supply the water demand. It would be very expensive and uneconomical to construct and operate a water treatment plant to convert surface water to potable water fit for drinking.

## II. GROUND WATER RESOURCES

Ground water is very abundant especially in Brgy. Lumbad due to the convergence of the three big rivers in this barangay. This is attested to by the presence of many wells dug or drilled in the area. The largest well drilled in the service area is owned by the Dingras Water District. It has a diameter of 200 mm and depth of 83 m. Most of the households in Dingras, not served by the Water District, have their own wells.

## III. WATER QUALITY

The sole product of the water district is water and it is mandatory for this product to meet at least the minimum standards specified by the Philippine National Standard for Drinking Water (PNSDW). The water district is required to have a sample of its water tested by an accredited Department of Health (DOH) laboratory for bacteriological presence at least once a month.

The Water District's responsibility for safe water makes it imperative to eliminate harmful organisms by some means, of which the standard is treatment with chlorine, as will be discussed.



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As part of its routine water quality maintenance procedures, the water district should routinely, on a daily basis, take readings of chlorine residuals at different distribution points using a chlorine comparator

## i. Microbiological Indicators for Drinking Water Quality

The frequent examinations for fecal indicator organisms remain as the most sensitive and specific way of assessing the hygienic quality of water. Fecal indicator bacteria should fill certain criteria to give meaningful results. The test required to detect specific pathogens are generally very difficult and expensive so it is impractical for water systems to routinely test for specific types of organisms. A more practical approach is to examine the water for indicator of organisms specifically associated with fecal contamination. An indicator organism essentially provides evidence of fecal contamination from humans or warm-blooded animals. The criteria for an ideal organism are as follows:

- Always present when pathogenic organism of concern is present, and absent in clean, uncontaminated water;
- Present in large numbers in the feces of humans and warm-blooded animals;
- Respond to natural environmental conditions and to treatment process in a manner similar to the waterborne pathogens of interest;
- Readily detectable by simple methods, easy to isolate, identify, and enumerate;
- Ratio of indicator/pathogen should be high;
- Indicator and pathogen should come from the same source (gastrointestinal tract).

Water intended for human consumption should not contain indicator organisms. However, pathogens more resistant to conventional environmental conditions or treatment technologies may be present in treated drinking-water in the absence of E-coli or total coli forms. Protozoa and some enteroviruses are more resistant to many disinfectants including chlorine, and may remain viable and pathogenic in drinking water following disinfection process (PNSDW 2007).

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## D. EXISTING SYSTEM FACILITIES

The existing water supply facilities of Dingras Water District consists of source and pumping facilities, transmission and distribution facilities, storage facilities and chlorinating facilities.

### I. SOURCE AND PUMPING FACILITIES

All the five water sources of the Dingras Water District at present are deep wells. Three of which are located in the Municipality of Dingras, while the other two are in the Municipality of Marcos.

The depth of the wells in Barangay Guerrero, Dingras constructed in 1925 and 1936 is 30 meters below ground level (mbgl). The capacity of the well in Barangay Guerrero beside the Water District office is 7 lps while the well near Brgy. Medina has a capacity of 3 lps. The third well located in Brgy. Puruganan was constructed in 1998. It has a depth of 83 meters below ground level and a capacity of 12 lps. The water in all of the wells is pumped directly to the distribution system of Dingras. The wells are enclosed in semi-concrete houses and equipped with submersible pumps and chlorinating equipments. All of the pumping stations are equipped with stand-by generators except for the Pumping Station No. 2 located in Brgy. Guerrero, near Brgy. Medina.

The well in Brgy. Valdes, Marcos was completed in April 2010. It has a depth of 83 meters below ground level and capacity of 12 lps. It serves Barangays Valdez and Lydia. The excess water flows to Barangays Parado and Medina of Dingras. The drilling of the well in Brgy. Fortuna was completed on June 2013. It has a depth of 80 meters below ground level and a capacity of 7.5 lps. Water from this well goes to Barangay Fortuna and Daquiaog. The well sources in the Municipality of Marcos are not enclosed in pump houses. The stand-by generators are the only equipments housed in the concrete pump houses.

A Booster Pumping Station was constructed in Brgy. Root to increase the pressure and water supply in Barangays Saldares and Sulquiano, which has a rolling terrain due to its proximity to the hills in the area. A 3 hp submersible pump and a 15 kva generator were installed in the pumping station.



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Pumping Station Number	Location Dingras	Well Depth (mbgl)	Casing Diameter (Ø) mm	Capacity (Q) lps	Pump Type	Capacity (HP)	Generator (KVA)
PS # 1	Brgy. Guerrero	30	150	7	Submersible	10	50
PS # 2	Brgy. Guerrero	30	150	3	Submersible	7.5	None
PS # 3	Brgy. Puruganan	80	200	12	Submersible	15	40
PS # 4 Booster PS	Brgy. Root	N/A	N/A	N/A	Submersible	3	15
Pumping Station Number	Location Marcos	Well Depth (mbgl)	Casing Diameter (Ø) mm	Capacity (Q) lps	Pump Type	Capacity (HP)	Generator (KVA)
PS # 5	Brgy. Valdez	83	200	12	Submersible	15	30
PS # 6	Brgy. Fortuna	80	200	7.5	Submersible	7.5	15

Table 2 - Existing Well Sources and Pumping Facilities

For CY 2016, the district maintains five (5) water sources as follows:

Pumping Station Number	Location	Depth	Actual LPS	Method of Measurement	Average Daily Operation	Horse Power
I	Brgy. Guerrero	26	4.9	Volumetric	24 hrs.	10 HP
II	Brgy. Guerrero	26	7.0	Volumetric	24 hrs.	7.5HP
III	Brgy. Puruganan	70	3.0	Volumetric	24 hrs.	15 HP
IV	Brgy. Valdez	83	11.0	Volumetric	24 hrs.	15 HP
V	Brgy. Fortuna	80	7.50	Volumetric	24 hrs.	7.5HP

Table 3 - Current Water Sources for CY 2016

## II. MAINTENANCE OF PUMPS

### i. PUMPING TESTS

Pumping tests are carried out to determine the safe pumping yield, which establishes how much groundwater can be taken from a well, and what effects pumping will have on the aquifer and neighbouring well supplies. It is one of the design parameters for selecting the pump to be used.

It is only necessary for the water district to conduct the test for monitoring purposes. The general procedure for conducting this operation is as follows:

#### a. Required Tools and Equipment

- Pumping Unit (Submersible pump with a capacity greater than the yield requirement by at least 20%)



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- Water level indicator
  - Stopwatch
  - Containers for volumetric measurement of discharge
- b. Terminologies
- Static Water Level – the vertical distance from ground level (or unknown measuring point) to the water surface in the well when there is no pumping.
  - Pumping Water Level – the vertical distance from ground level ( or known measuring point ) to the water surface in the well during pumping.
  - Drawdown – the difference between the pumping water level and the static water level.
  - Well Yield – the volume of water per unit time that could be pumped from the well as determined by the pumping test.
- c. Discharge Measurements

Discharge measurements are usually measured by a flow meter. If there is no device to measure the flow, then volumetric measurements will be resorted to.

The volumetric method consists of noting down the time required to fill a container (bucket or drum). Better results are obtained with a larger container. For more accurate results, several trial measurements should be done and the average of these trials taken.

- d. Procedure
- Prior to starting pump, measure the static water level.
  - After starting the pump, measure the corresponding water levels. Discharge should be greater than the required yield and should be maintained at a constant rate during the entire duration of the test for 24 hours. Measurement intervals should be as follows:

Time from start of pumping (min)	Time intervals between measurements (min)
0-15	0.5-1
10-15	1
15-60	5
60-300	30
300-end of the test	60

Table 4 - Guide for measuring time and pumping

- Simultaneous with the water level measurements, take measurements of discharge.
- Monitor nearby wells to determine the effects during pumping.
- Right after the end of the pumping test, measure the water level recovery.
- Plot data obtained from the test on a semi-logarithmic paper showing the time in the abscissa (x axis) and the drawdown in the ordinate axis ( y axis).





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## ii. MAJOR CAUSES OF DETERIORATING WELL PERFORMANCE

The following are the five main causes of deterioration in well performance:

- Well yield reduction due to incrustation and growth of iron bacteria;
- Plugging of well screen due to build-up of fine particles;
- Sand pumping;
- Structural collapse of the well casing and screen; and,
- Condition of the pump.

## iii. PREVENTION AND REMEDIAL MEASURES

Prevention and Treatment of Iron Bacteria

- Care should be taken to avoid introducing iron bacteria into the well during drilling and repair work. For this purpose, equipment and materials (drill rods, filter pack) should be chlorinated prior to drilling or repair;
- Chemical treatment (application of strong oxidizing agent such as chlorine and chlorine compounds) to clear contaminating bacteria; and,
- Physical treatment (jetting, air or surge block surging, air lift pumping) to clear blockages.

## iv. PUMP LOG

A pump log should be maintained to record the daily pressure and flow readings of the pump. The time of the day when these readings are made should also be reflected. The schedule for operating and stopping the well pumps should relate the pump capacity to the data on the daily water demand and the water levels of the reservoir.

Daily Operation Log

Date	Time Start	Time Stopped	Pressure Meeting	Flow Reading		CL Usage		KW Reading		Remarks
				Start	Final	Initial	Final	Initial	Final	

Table 5 - Daily Operation Log

## v. PUMP OPERATIONS

The operation for the intake pumps used for water wells or surface water is simple. They are automatically started by the low level pressure and shut

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down by the high level pressure switches installed in the water storage or receiving tank. These pumps may set for manual operation by turning the control switch mounted on the pump base from the “Auto” to “Manual” setting, and using the start/stop buttons for the pump motor. However, care must be observed in stopping pump operation.

- Steps for Manually Stopping Pump Operation
  - Gradually turn the discharge valve unit until it is only about ¼ open\*
  - Use the “Stop” push button to stop the motor.
  - Totally close the discharge gate valve to prevent possible back flow.

Notes:

\*Do not close the valve suddenly, as sudden shut-off could create back pressure and flow surges.

## vi. **PUMP TROUBLE CHECKLIST**

The operator should be alert to the following indication of pump problems:

- Excessive heating of the motor;
- Change in the bearing noise level;
- Change in the pattern of oil consumption of the motor;
- Change in amperage or voltage load;
- Cavitation noise or other unusual noise; and,
- Presence of cracks or uneven settlement of the pad or ground around the pump.

## **E. CHLORINATING FACILITIES**

Disinfection is necessary to ensure that drinking water is free from disease-causing microorganisms. Water disinfection means the removal, deactivation or killing of pathogenic microorganisms. Disinfection is often universally employed by water distribution systems, even when water at the source is deemed already potable – as a precautionary measure to control the spread of waterborne diseases.

### **I. CHLORINE DISINFECTION (CHLORINATION)**

Chlorination is the process of adding the element chlorine to water to make it safe for human consumption as drinking water. Chlorine (and



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its compounds) is the most widely used disinfectant for water systems because of its effectiveness, cheap cost, and availability.

It has an advantage of oxidizing bacteria and virus even after the point of application due to its residual action. Hence, any bacteria introduced to the system after the point of chlorination can still be eliminated by the residual chlorine.

## II. DETERMINANTS OF CHLORINE EFFECTIVENESS

- a. Contact Time (CT & Dosage) – refers to the period of time allowed for the disinfectant to react with the microorganisms that may be in the water. Dosage refers to the amount of chlorine infused in relation to the volume of the water being treated.
- b. The Type of Microorganism – Chlorine is quite effective in destroying the most significant pathogenic organisms that are dangerous to humans and are commonly borne in water. Different pathogens and parasites, however, have different levels of resistance to it. Thus, the dosages, the CT, and other conditions of the water that intensify or inhibit the oxidizing action of chlorine such as temperature and PH need to be considered in order to be sure that the harmful organisms and undesirable substances are eliminated.
- c. Characteristics of the Source Water – The nature of the water that requires treatment influences the disinfection. Materials in the water often react with disinfectants, effectively increasing the chlorine demand. Turbidity of the water also reduce the effectiveness of disinfection.
- d. Usually, the tests on the water from a new source are the basis for prescribing the dosage and CT needed to eliminate the harmful and undesirable substance. Additional tests on the water at source need to be conducted when there are indications that the source water characteristics have changed. The possibility of contaminants (whether pathogens or minerals that change its acidity or turbidity) in the path of the water or in the proximity of the sing box or reservoir need to be checked.
- e. Temperature of Water – Higher temperatures usually increase the speed of reactions and of disinfection.

## III. TERMINOLOGY AND DEFINITIONS



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- a. Available Chlorine Content – is amount of chlorine in a chlorine compound, which determines its potential disinfecting power.
- b. Chlorine Demand – is the total amount of chlorine needed to oxidize all the materials in the water that react with chlorine within a given period. After all the reactions within that period are completed, the pathogens and undesirable organic substances, as well as the soluble iron, manganese, and hydrogen sulphides are deemed to have been destroyed, neutralized, or eliminated. It is the difference between the amount of chlorine added to water and the amount of residual (remaining) chlorine at the end of a specific contact period. If no residual chlorine is detected, it means that the chlorine demand was so great it exhausted the chlorine, thus the chlorine infused into the water (dosage) was insufficient.
- c. Chlorine Residual – it is the total amount of chlorine (combined and free available chlorine) remaining in water at the end of a specific contact period following the infusion of chlorine. The chlorine residual is an important indicator of safe water because as long as the residual chlorine is present in the water, disinfection is a continuing process.
- d. Dosage of Chlorine – is the quantity of chlorine applied to a specific quantity of water. Dosage is expressed in milligrams per litre (mg/l) of chlorine.
- e. Dosage Rate – is the amount of chlorine applied per unit time. It is usually in grams/day or kg/day.
- f. Superchlorination – this means applying chlorine at very much higher than the usual dosages. If a system design or requirements do not allow adequate contact time for the normal dosages of chlorine to eliminate the pathogens and undesirable substances in the water, Superchlorination could be resorted to. It provides a chlorine residual of 3.0 – 5.0 mg/l, which is 10 times the recommended minimum breakpoint chlorine concentration<sup>1</sup>
- g. Dechlorination – removes excessive levels of chlorine from the water. Dechlorination is considered a necessary phase after Superchlorination in order to remove the odour, taste, and the other objectionable traces of excess chlorine in the water. It commonly involves the use of an activated carbon filter.
- h. Shock Chlorination (dosage of 200 mg/l for 3-4 hours) is recommended whenever a well, reservoir or pipeline is new, repaired, or found to be contaminated. This treatment includes high levels of chlorine to the water. Unlike superchlorination, shock chlorination is a “one time only” occurrence, and chlorine is depleted as water flows or is flushed through

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<sup>1</sup> Breakpoint Chlorination uses the continual addition of chlorine to the water to the point where chlorine demand is met and all ammonia is oxidized, so that only free chlorine remains.

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the system. If bacteriological problems persists following shock chlorination, the source of the contamination of the system should be determined and eliminated.

## IV. CHLORINE DOSAGE AND DEMAND

All of the water source facilities of the Dingras Water District are equipped with chlorinators. Powdered chlorine is first diluted in a drum then pumped into the transmission by a chlorinator. The chlorinator is calibrated to inject the chlorine solution according to the quantity of water pumped in order to ensure a 0.2 residual chlorine at the extremities of the distribution system.

## V. CHLORINE DOSAGES

The commonly used dosages for various disinfection requirements are as follows:

- a. For disinfection of water supplies:
  - Dosage: 0.5 – 2.0mg/l
  - Contact Time: 20-30 minutes
- b. For disinfection of newly constructed/repared wells, storage tanks, pipeline, spring box, etc.:
  - Dosage: 50 mg/l
  - Contact Time 24 hours or
  - Dosage: 300 mg/l
  - Contact Time: 1 hour

## F. TRANSMISSION AND DISTRIBUTION FACILITIES

### II. TRANSMISSION LINES

Transmission lines connect the water source facility to the reservoir or the distribution lines if the water source is far from the distribution system.

There are no transmission lines in Dingras because the water from the wells is pumped directly to the distribution system. In Marcos, the transmission lines consist of 150 mm and 100 mm diameters PVC pipes. The water from Pumping Station No. 5 (PS # 5) in Brgy. Valdez is pumped to the distribution lines along the National Highway through a 150 mm diameter PVC transmission pipe about 428 m in length. The 150 mm diameter



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transmission line from PS # 6 in Brgy. Fortuna has a length of about 800 mm.

## III. DISTRIBUTION FACILITIES

The O&M of a water distribution system is directed at the following general objectives:

- To ensure adequate pressure in the system 24/7;
- To minimize non-revenue water (NRW);
- To ensure that the water delivered is potable.

The distribution system consists of four components, whose O&M requirements are based on their unique characteristics as well as their function and contribution to the total system. They are:

- Distribution Pipelines
- Storage tanks or reservoirs
- Service connections or standpipes
- Valves and other appurtenances

### *i. DISTRIBUTION PIPELINES* **SOUND OPERATION PRACTICES**

Properly constructed pipelines can provide years of trouble-free operations. However, sound operation practices need to be observed, both to ensure water quality and to prevent the deterioration of pipeline efficiency. Sound operation practice can be summarized as follows:

- Always maintain positive line pressure. Negative pressure could result in backflow from private storage and the intrusion of foreign water/matter that may pollute or contaminate the system.
- Always open and shut off valves gradually. Abruptly opening or shutting off a valve can cause sudden surges, changes in water velocity, and reversals of flow that might produce water hammer effects that could stir up sediments, making the water dirty, and damage valves and weaken pipe joints.
- Implement an appropriate flushing program to clear sediments from the system. Such a program should institute the regular, periodic flushing of the pipes, as well as prescribe the maintenance measures for those sections of the system that are more prone to sediment build-up, such as dead-end pipes and low sections. These sediment-prone sections should be pre-identified and, if needed, provided with additional blow-offs and hydrants to facilitate flushing and disinfection.

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## ii. DISTRIBUTION PIPELINES



In 1982, before the formation of the Dingras Water District (DWD), the DPWH reconstructed the water supply system of Dingras. DPWH installed about 9 kilometer of pipelines with diameters ranging from 32 mm to 150 mm of PVC and GI pipes. Additional 4.67 km distribution lines were laid in 1998 with the implementation of the PHP 4 million loans from LWUA. The pipes are all PVC with mostly 50mm diameter, 75mm diameter, 100mm diameter, and 150mm diameter. A PHP 5 million loan was again granted to the DWD wherein additional 4,420 lm of 75mm diameter and 1,700lm, 50mm diameter PVC pipes were laid.

With the annexation of the Municipality of Marcos to the service area of the Water District in 2010, LWUA again granted a loan of PHP 20 million from its Non-LWUA Initiative Funds (NLIF) for the construction of the water supply system in Marcos. An 8.5 km of PVC pipes with diameters ranging from 50mm to 150 mm were installed.

The exact location of pipes can be determined by referring to records or as-built plans of the water supply system. In cases where records are inadequate or lost, underground pipes might be pinpointed by:

- Asking old residents who witnessed their installation;
- Using pipe locators;
- Trial excavation.

### Locating Pipes with Pipe Locators

The position of water mains can easily be pinpointed with the use of a pipe locator. A small water utility, however, is unlikely to own this very expensive piece of equipment. It may have to rent one, unless it can be borrowed from a government agency that has one.

### Locating Pipelines by Trial Excavation

- In the vicinity of the reported problem, select a primary reference point that you can use to establish the position of the problem pipeline. An exposed pipe section, a gate valve, or a gate valve box would be a good primary reference point;

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- Where there is no exposed pipe section, select any point on the north or east side of the road and make an excavation. In the Philippines, water mains are usually installed at the north or east side of the road;
- If a water main is not found at the first point excavated, try again at another point on the north or east side of the road within the same vicinity. Continue the trial and error process until a water main is located;
- Using the water main just located as reference point, select a second point 50 to 100 meters from it and make another excavation;
- Once a second excavation point reveals the water main, draw an imaginary line connecting the successful excavation points 1 and 2. The connection of the two points is the exact position of the buried pipe;
- Repeat the above process using the identified points as reference until all pipelines are pinpointed.

## Cleaning Pipelines

Water going through the pipelines may sometimes carry sand, sediments, and organic and other objectionable matter. When water velocity is low, these tend to get deposited and build up inside the pipes. The built-up deposits decrease the carrying capacity of the pipes and increase internal friction, making the pipelines less efficient. Less water can be delivered per given time, pumping costs increase, and the added and uneven pressure within the pipelines increases the likelihood of breaks and leaks. These effects are complicated when magnesium and calcium salts are present in the water (hard water), as their precipitation results in scaling inside the pipes. Likewise, when organic matter is present in the deposits, bacteria proliferate, causing undesirable odours, and an off-taste and color in the delivered water.

The method for removing solids which are not cemented to the inside surface of pipes is to flush with water at high velocity. Annual flushing is generally sufficient to maintain the pipelines clean. Dead end pipes should be flushed and disinfected at least once a year. Furthermore, whenever mains are opened for repair, they should also be flushed and disinfected.

The flushing procedure is as follows:





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- Isolate the water mains to be cleaned by closing the appropriate control valves;
- Empty the water mains by opening the blow-off valve or other temporary outlet at the lower end of the pipeline. In some cases, to expedite the emptying of water mains without pumping, compressed air may be introduced at the highest point of the isolated system;
- Inject water at high-induced velocity (1.0 meter per second or higher) until the objectionable materials are expelled;
- As needed, disinfect the pipelines. After disinfection, flush the pipeline with clean water until the chlorine-odor is hardly detectable;
- Put pipelines back to operation.

## G. STORAGE FACILITIES

Dingras Water District has five concrete storage facilities. Two of which are located in Dingras and three are in Marcos.

The main storage facility of Dingras water system is a 240 cu.m elevated concrete reservoir located in Brgy. Guerrero. The hollow bottom of the reservoir serves as the office of the Dingras Water District. The water flows to the reservoir during low water demand and goes down to the distribution system during peak demand. The other storage tank in Dingras is a 32 cu.m concrete ground sump located in Brgy. Root. It is used to store water for pumping to the higher grounds of Brgy. Sulquiano.

Of the three reservoirs in the Municipality of Marcos, one is a 50 cu.m elevated concrete tank located in Brgy. Lydia at the back of the municipal hall. It was donated to the DWD by the Municipal Government of Marcos when the water system was constructed. Together with this reservoir, the municipal government also turned over an 8 cu.m ground reservoir located on the opposite side of Brgy. Lydia. The third storage tank in Marcos is a 50 cu.m concrete ground reservoir located in Brgy. Fortuna constructed in 2013.

## I. OPERATION

Water distribution is pumped from the water source to the system's water tank or reservoir, from which it is delivered to the consumers through



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the pipelines. The reservoir is designed, based on the requirements of the system, to distribute the water by gravity or by pumping.

## II. CLEANING

The quality of water coming from the reservoir must be maintained within the standards for potable water. To ensure the quality of the water supply, the reservoir must be cleaned and disinfected periodically. Failure to apply this routine will result in the accumulation of solids and proliferation of bacteria in the tank, making the water unsafe for drinking.

### - General Precautions

- Storage facilities tend to attract children who like to play around the facilities, climb the ladders, and play on top of concrete roof, oblivious of the serious hazards involved. All gates, access hatches and manholes of reservoirs should be locked. Never leave a storage facility for even a few minutes without locking all access openings.
- Vandals are known to intentionally damage storage facilities. Utilities should keep watch against vandalism to protect the stored water and the public from health hazards. If a covered storage facility is found to have been forced open, it must be assumed that the water has been contaminated. Therefore, the reservoir should be drained to waste and disinfected before being refilled with new water. All fences should be maintained in good condition. Do not allow any materials to be staked out on fences, as these could aid trespassers to climb over.
- Keep reservoir roof ladders and walkways free of dirt, debris and grease to prevent slipping and contamination.
- Never enter a closed reservoir alone without someone standing by to help if you get in trouble.
- Keep alert for cracks/leaks in the reservoir and repair these at once.
- Never store unchlorinated water in a reservoir for more than 72 hours.
- The foundations of concrete reservoirs and elevated steel tanks are subject to differential settlement when the soil beneath one part of the foundation compresses more than the soil at another part. A differential of only 1-2 cm can cause large stresses in the reservoir wall or



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legs. When differential settlement is discovered, corrective measures are urgent. These require the services of soil engineer and special equipment.

## H. NON-REVENUE WATER (NRW)

Non-revenue water (NRW) is water that has been produced but does not result in revenues for the Utility. NRW may be due to “real losses” (as a result of leaks and wastage, sometimes called “physical losses”) or “apparent losses” (for example through theft or metering inaccuracies). High levels of NRW are detrimental to the financial viability of water utilities, as well as to the quality of water itself. NRW is typically measured as the volume of water “lost” as a share of net water produced.

### I. REDUCING NON-REVENUE WATER

#### ANALYZING NRW LEVEL

The percentage NRW can be determined by the formula:

$$NRW (\%) = \left\{ \frac{[Production (m^3) - Billed Consumption (m^3)]}{Production(m^3)} \right\} \times 100$$

If NRW for a new system is more than 10 %, or for an old system more than 25%, the Utility can benefit from a NRW reduction program. To accurately determine NRW, reliable and functional meters must be installed at all sources and service connections.

#### PREVENTION IS BETTER THAN THE CURE

If, in the first place, the facilities were not constructed properly, there is probably very little that can be done to reduce NRW. Therefore for pipeline installation, all materials should pass quality control/testing and should undergo pressure tests prior to backfilling.

Many leaks emanate from service connection joints. When installing service connections do not skimp on Teflon tape on threaded joints and inspect for leakage before backfilling.

#### BENEFITS OF NRW REDUCTION



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- Financial gains from increased water sales or reduced water production, including possibly the delay of costly capacity expansion;
- Reduced operational cost which will result in a lower tariff;
- Increased fire fighting capability due to increased pressure;
- More consumers can be served, or longer operational hours;
- Easier to sell increased tariffs; and,
- Reduced risk of contamination

Leakage reduction may also be an opportunity to improve relations with the public and employees. A leak detection program can be made highly visible so that water conservation can be at the forefront in people's awareness. The reduction of commercial losses, while politically and socially challenging, can also improve relations with the public, since consumers may be reluctant to pay their water bills knowing that many others use services without being billed or being under billed.

## SOURCES OF NRW

NRW can be analyzed on whether they are physical or actual losses or losses due to commercial policies or deficiencies.

- Physical Losses
  - Leaks/Breaks
  - Illegal Connections
  - Water usage by water district (flushing, etc.)
- Commercial Losses
  - Non-metered connections
  - Under-registration of meters
  - Poor collection performance

## NRW REDUCTION APPROACHES

A number of approaches have been used successfully by some of the major water utility companies. These can be adopted by the LWDs to control their NRW ratios.

- Isolation of zones and continuous measurement and analysis of inflows to determine the areas with high NRW.
- Programs to improve the reliability of customer metering and reading.
- Hydraulic analysis of the distribution system to determine calculated versus actual pressures. (This requires updated system maps).



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- Analysis of maintenance records to determine what repairs have been done, where, and their frequency. This may lead to decisions to replace rather than repair some pipelines. (For this reason, it is important to inculcate among field personnel the value of clear, reliable reports, and to have a good user-friendly repository of records.)
- Leak detection programs. While there should be a continuing program of leak detection, periodic high-visibility campaigns involving the public have also been found to be effective.
- Modulation of pressure in the pipelines. Higher pressures will naturally increase the rate of leakages.
- Strengthening the procurement and stock management of critical and often used repair and maintenance materials, so that these will always be available when needed. While many repairs can be done with readily available substitute materials, temporary stop-gap solutions cannot be relied upon to fix long term and recurring problems.
- Continuous management attention: The reduction of NRW should be considered by management and the board as a continuing oversight concern.

## NRW SURVEY

When NRW is analyzed to have increased, due likely to pipeline leaks, an NRW survey should be carried out to pinpoint the problem. The steps are as follows:

- Divide the entire distribution system into zones;
- Isolate the different zones by closing or installing appropriate control valves. Observe the water consumption rate in each zone and compare with billed consumption. Determine the zones abnormally high NRW;
- Divide the pinpointed zones, which consume a large quantity of water into sub-zones. The water inflow can be measured using zone and sub-zone meters;
- Isolate these different subzones and study their respective NRW;
- Select the subzone(s) with unusually high water consumption rates. Subdivide further and measure their water consumption rate;
- Repeat the processes above until the location of leak(s) are pinpointed.

## LOCATION OF LEAKS

Leaks in water mains cause the loss of good water and at the same time increase the risk of contaminants in the ground entering the piping



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system. These leaks may be due to ruptures or disintegration of pipes and pipe joints, usually caused by corrosion; vibrations from vehicular traffic, stresses generated by expansion and contraction, or ground movements.

## - Locating Leaks by Direct Observation\

This method is the simplest and most applicable leak detection technique for use in small water supply systems. This requires being alert to the following signs of leaks:

- Appearance of wet spots at early dawn during dry season;
- Greening of patches of ground in areas where plants generally could hardly grow;
- A soft wet spot in the ground during dry season;
- Abnormal drops in pressure.

The consumers can help detect leaks if they are made aware of these indicators. If they look at the Utility's water service in a positive light, and consider it to be their benefit, there is no reason why they would not go out of their way to inform the operator if they notice any of these signs.

## - Finding the Exact Location of Leaks in Pipelines

After finding the approximate location of leaks in the water distribution system, their exact location can be determined by using a sounding rod. Leaks in water pipes usually make sound – small leaks make more noise than large ones. The sounding rod is a pointed metal rod used to relay to the observer the sound caused by leaks in buried pipes. The procedure involves the following:

- Push the sounding rod into the ground until its end touches the buried pipe. Be careful not to push it too hard in order not to destroy a PVC water main when its point strikes the pipe;
- Put your ear to the exposed end of the rod and listen for the sound. If the sound is too faint, a hearing aid such a stethoscope would be helpful;
- Push the rod into the ground against the same pipe at a different location. If the sound is louder, then you are getting closer to the leak. If the sound is fainter, it means you are moving away from the location of the leak.

## ILLEGAL CONNECTIONS

Illegal connection can be detected by any of the following methods:



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- Block Census

Key in the information to be obtained in a block census is where those who are not connected to the system are getting their water. If their source cannot be determined, the dwelling unit is considered suspect.

- Reward System

Offering rewards to those who can pinpoint illegal connections has been known to be effective. The reward can be a portion of the collectibles.

- Monitoring Consumption

A high NRW within a sub-zone without any leaks indicates the presence of illegal connections. Any customer whose consumption drops to a small percentage of his average consumption without any adequate cause should be suspect.

The Board should come up with a policy on penalties for those caught with illegal connections, which would be the basis of management action.

- Optimum Meter Replacement Cycle

The Water District adopted the Change Water Meter Programs, an initiative to reduce non-revenue water by replacing water meters 5 years old and above.

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**THE FOLLOWING PROCEDURES AND OPERATIONS WILL FOCUS ON  
THE FINANCIAL TRANSACTIONS AND SERVICES BETWEEN THE  
DINGRAS WATER DISTRICT AND ITS CONCESSIONARIES**

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The Application and Contract for Water Services can be found in Annex 3.



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

## J. REQUEST FOR NEW CONNECTION

### Who can avail the service?

- Residents of Dingras who want to have safe and potable water at a very affordable rate.

### Requirements:

- Accomplished Application Form

### Schedule of Service Availability:

- Monday to Friday : 8:00 AM to 5:00 PM

### Fees:

- Membership by:

Standard Service Connection Materials	Saddle Clamp 2" x ½ & Replacement Brass ½	Saddle Clamp 3" x ½ & Replacement Brass ½	Saddle Clamp 3" x ¾ & Replacement Brass ¾	Saddle Clamp 4" x ½ & Replacement Brass ½	Saddle Clamp 4" x ¾ & Replacement Brass ¾	Saddle Clamp 2" x ¾ & Replacement Brass ¾
1 pc Saddle Clamp	250.00	300.00	350.00	400.00	450.00	300.00
2 pcs Replacement Brass	490.00	490.00	600.00	490.00	600.00	600.00
2 pcs GI Nipple ½ x 18	300.00	300.00	300.00	300.00	300.00	300.00
1 pc GI St. Elbow ½	30.00	30.00	30.00	30.00	30.00	30.00
3 pcs GI Elbow ½	135.00	135.00	140.00	135.00	140.00	140.00
1 pc Ball valve ½	350.00	350.00	350.00	350.00	350.00	350.00
3 rolls Tapelon	60.00	60.00	60.00	60.00	60.00	60.00
1 pc Water Meter and Membership	1,458.00	1,458.00	1,458.00	1,458.00	1,458.00	1,458.00



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

1 pc GI Elbow Reducer			40.00		40.00	40.00
<b>TOTAL</b>	3,073.00	3,123.00	3,328.00	3,223.00	3,428.00	3,278.00

Table 6 - Membership Fees based on Materials

ADDITIONAL MATERIALS AVAILABLE	AMOUNT
P.E. HOSE ½	28.00
P.E. HOSE ¾	35.00
ELBOW REDUCER ¾ X ½	40.00
COUPLING REDUCER ¾ X ½	85.00
COUPLING 1	60.00
COUPLING ½	30.00
COUPLING ¾	50.00
ELBOW ½	45.00
REPLACEMENT BRASS 1	400.00

Table 7 - List of Additional Materials and Fees

## How to avail the Service:

STEP	CLIENT	SERVICE PROVIDER	DURATION OF ACTION	PERSON-IN-CHARGE
1	Secure application form from Dingras Water District	Give application form and provide client with a short briefing on the service	5 minutes	Customer Service Assistant E
2	Accompany the plumber in conducting ocular inspection site	Prepare estimate of materials needed and inform the applicant of the materials and fees	1 hour	Plumber C
3	Submit to the General Manager the	Review, estimate, and approve the	10 minutes	General Manager

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

	application form	application		
4	Pay the necessary materials and fees required and receive the Official Receipt	Require the applicant to proceed to the office to pay for the materials and fees. Issue Official Receipt.	30 minutes	Customer Service Assistant E
5		Get needed materials and proceed immediately to the area for installation	4 hours for connection near tapping sources, 3 days for connection that requires boring activity	Plumber C

Table 8 - Procedure for the New Connection

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

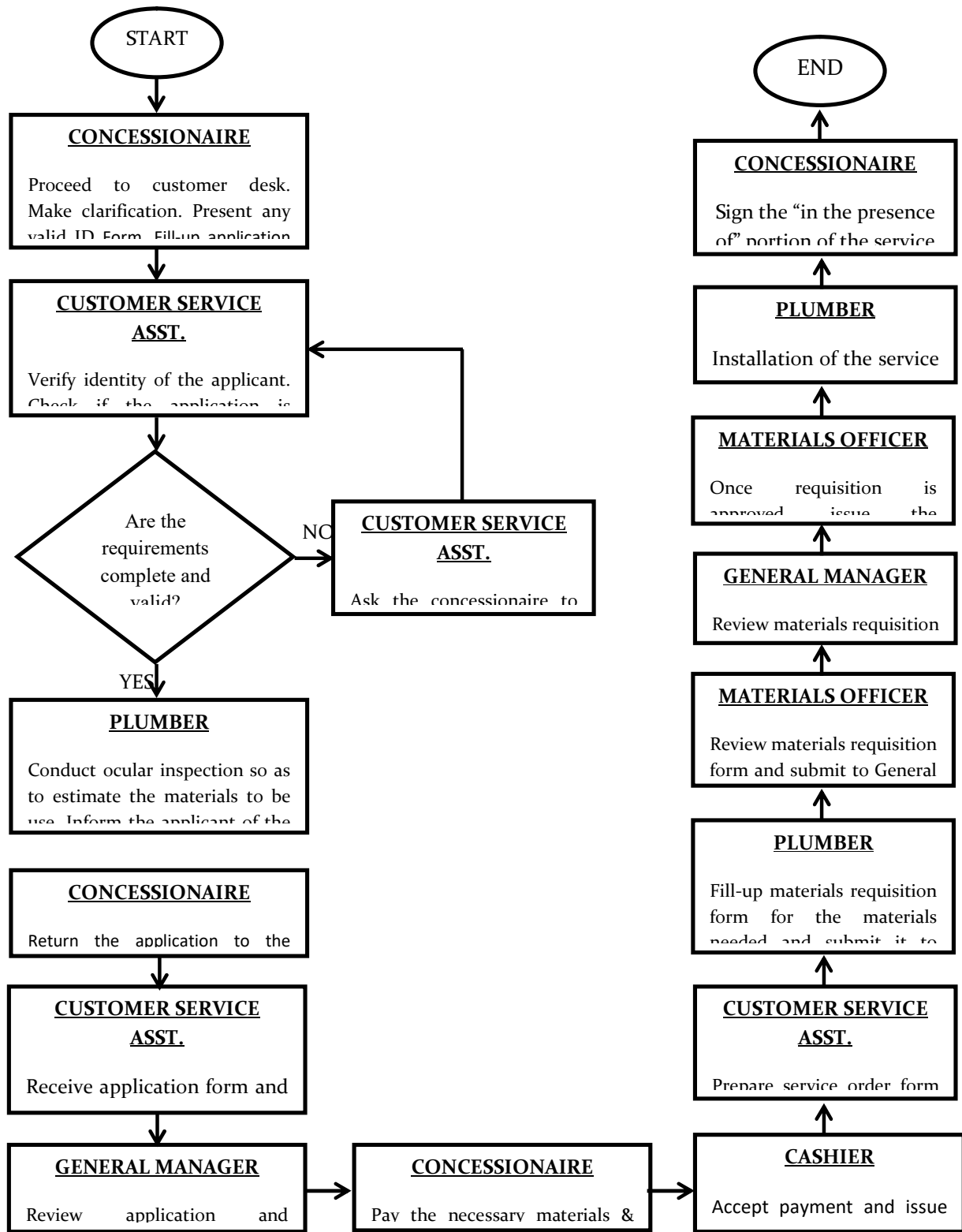


Figure 5 - Procedure for the New Connection

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

## K.REQUEST FOR RECONNECTION

### Who can avail the service?

- Concessionaires who want their water service reconnected.

### Requirements:

- Accomplished Request Form

### Schedule of Service Availability:

- Monday to Friday : 8:00 AM to 5:00 PM

How to avail the Service:

STEP	CLIENT	SERVICE PROVIDER	DURATION OF ACTION	PERSON-IN-CHARGE
1	Proceed to the Dingras Water District Office to request for reconnection	Proceed immediately on the area of reconnection	Depends on the accessibility of the area	Plumber C

Table 9 - Procedure for Re-Connection



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

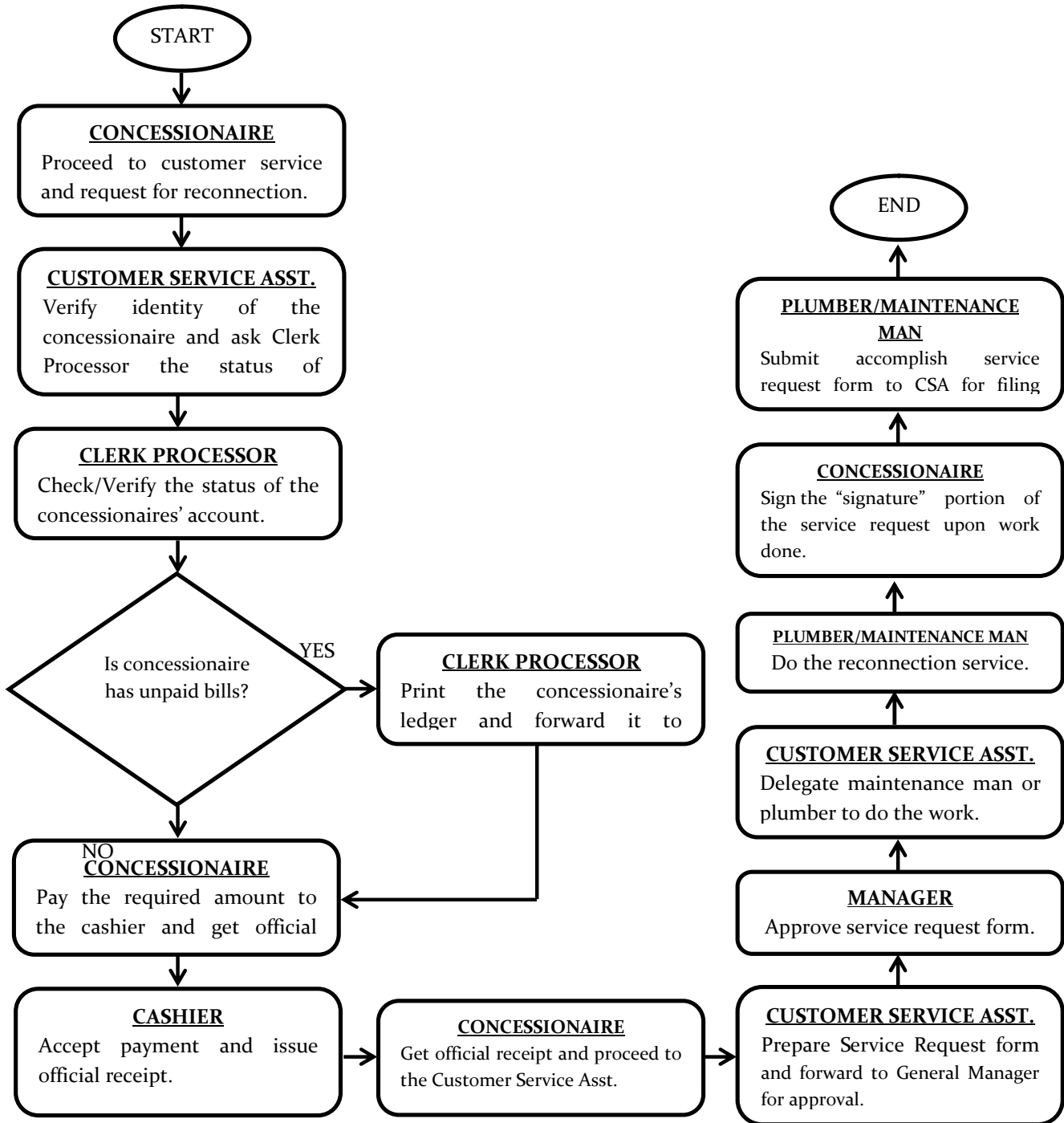


Figure 6 - Procedure for Re-Connection

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

## L. REQUEST FOR DISCONNECTION

### Who can avail the service?

- Concessionaires who want their water services disconnected.

### Requirements:

- Accomplished Request Form

### Schedule of Service Availability:

- Monday to Friday : 8:00 AM to 5:00 PM

How to avail the Service:

STEP	CLIENT	SERVICE PROVIDER	DURATION OF ACTION	PERSON-IN-CHARGE
1	Proceed to the Dingras Water District Office to request for disconnection	Proceed immediately on the area of disconnection	Depends on the accessibility of the area	Plumber C

Table 10 - Procedure for Disconnection



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

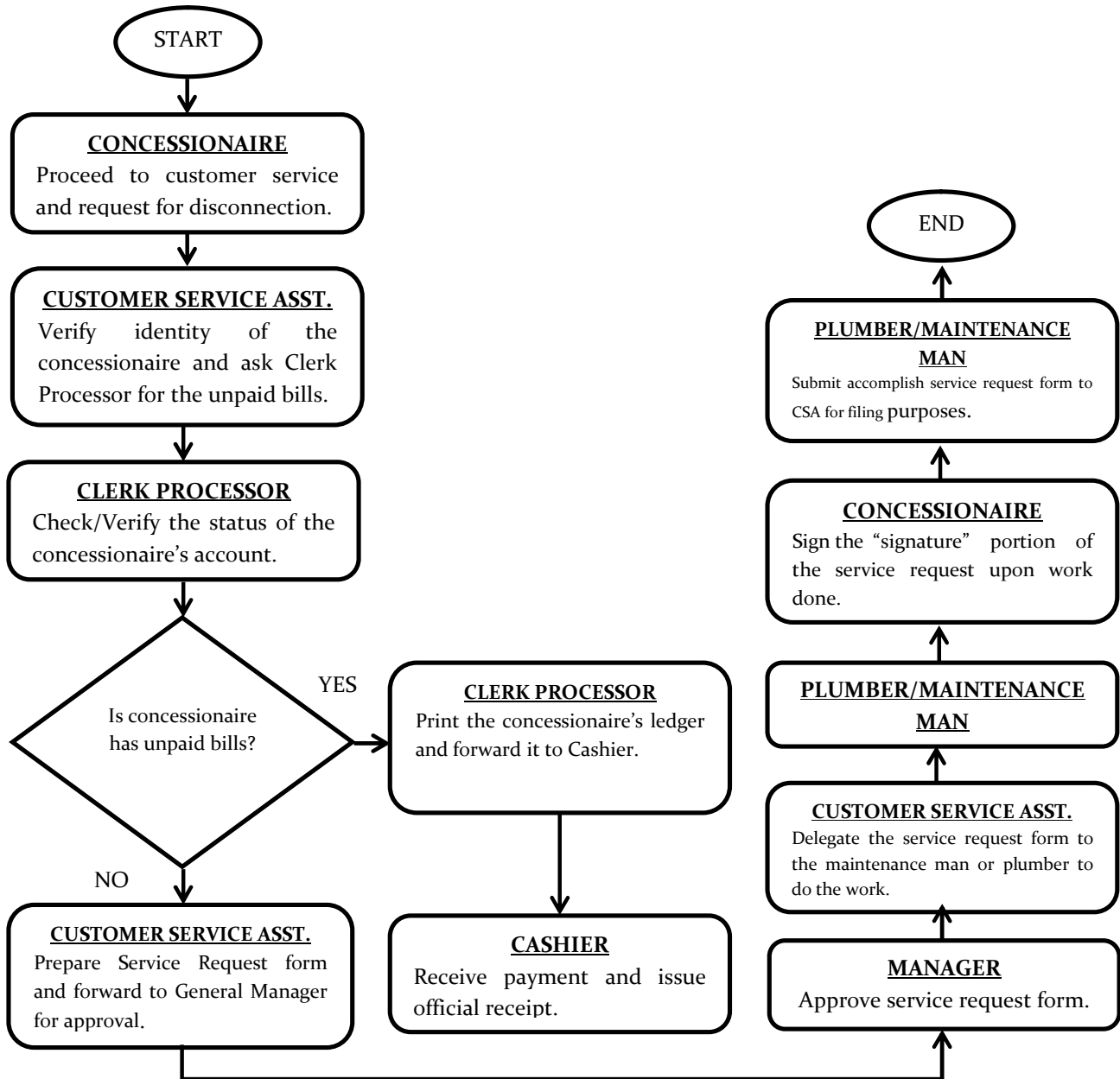


Figure 7- Procedure for Disconnection

## M. PAYMENT OF WATER BILLS

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

## I. ISSUANCE OF RECEIPT OF BILL PAYMENT

### Who can avail the service?

- Concessionaries who consumed water service of Dingras Water District and who opt to pay their bills at the Dingras Water District Office.

### Requirements:

- Water Bill

### Schedule of Service Availability:

- Monday to Friday : 8:00 AM to 5:00 PM

### Fees:

- Depends on the existing water rates and bill receipt dates

How to avail the Service:

STEP	CLIENT	SERVICE PROVIDER	DURATION OF ACTION	PERSON-IN-CHARGE
1	Proceed to the Dingras Water District Office and pay the water bill	Accept payment and prepare the Official Receipt	5 minutes	Customer Service Assistant E
2	Get the Official Receipt	Give the Official Receipt to the client	5 minutes	Customer Service Assistant E

Table 11 – Procedure for the Payment of Water Bills

## II. OFFICE COLLECTION OF WATER BILLS

### *Office Collection of Water Bills Detailed Procedure*

#### CUSTOMER SERVICE ASSISTANT

1. Receives daily from the General Manager, copies 1 and 2 of Water Bills Current and overdue (with penalty charges) showing quantity and total amount of water bills issued for each barangay; acknowledges receipt of bills by signing on the Collector's Accountability Record maintained by the General Manager.



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

2. Files original and duplicate copies of bills received in pigeonholes classified as to barangay number and due date.
3. When concessionaire pays, obtain from the concessionaire copy 3 of the water bill (given at the time of water reading) and takes out the file copies 1 and 2 of the water bill. Compares account number and amount with copies 1 and 2 of the water bill.
4. Receives payment from the concessionaire, counts money and compare with total charges shown on the bill or total amount due, in the case of overdue bill. Sign both copies of water bills to acknowledge payment and indicate form or payment and check number on the bill in applicable cases. Give copy 1 to the concessionaire. In case of partial payment, C.O.R. is issued instead of the water bill. The date, amount, C.O.R. Number and the corresponding balance due are indicated in both copies of water bills and signed by the collector.
5. Prepares a Daily Collector's Report in two copies, showing breakdown of collection into current, arrears (including penalty charge) of current and previous years and other charges. Bills collected on or before due date are considered "current"

Any partial payment is to be credited to arrears first with any remaining balance credited to the current billing.

Counts collection for the day and compares total amount with that reported in the Daily Collector's Report. Turns Over the collections and submits all the copies of the report together with the duplicate copies of the paid water bills to the General Manager.

6. Uncollected bills on the previous month are returned after the current month's bills are received. Returned bills are recorded on the Collector's Accountability Record and duly acknowledge by the General Manager.
7. Receives uncollected bills of the previous month from the General Manager. Invalidates the bills by stamping "Not valid as Receipt" on the face of the copies 1 and 2 of the Bills. File the Bills.
8. Based on the complaints from the concessionaires or as soon as billing adjustments are found to be necessary, prepares a Billing adjustment memo in two copies. Forwards both copies to the General Manager for review and approval.
9. After approval, receives from the General Manager copy 2 of the Billing Adjustment memo. Files copy.

## **GENERAL MANAGER**

1. Receives uncollected bills from the previous month's billing.
2. Records quantity and amount returned by Billing and Collection Clerk in the Collector's Accountability record. Files Collector's Accountability Records.

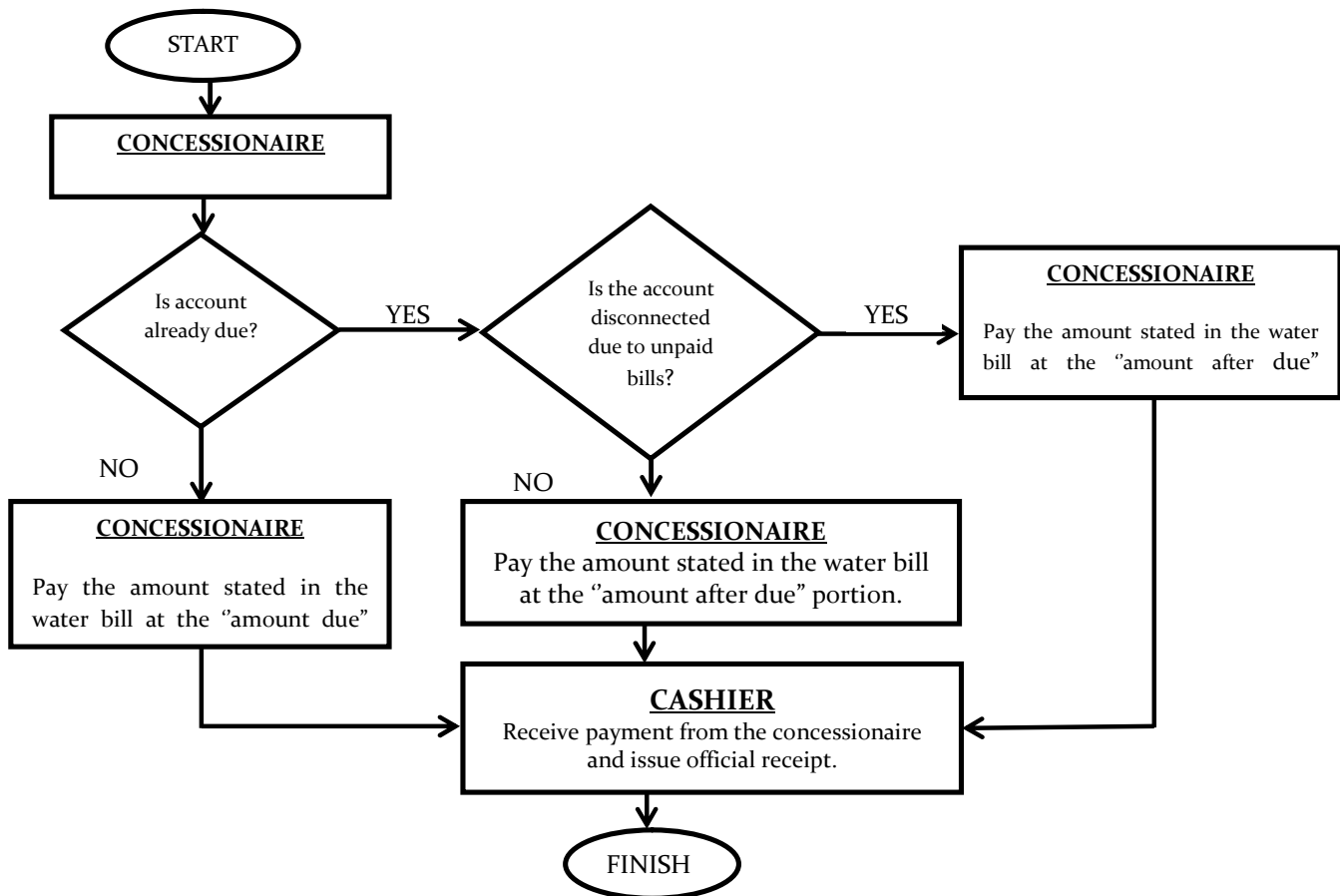


# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

3. Immediately forward these bills to the Billing and Collection Clerk after checking and verification
4. Receives from the billing and collection clerk copies 1 and 2 of billing adjustment memo. Receives and approved adjustment and returns copy 2 of the memo to the billing and collection clerk. Forwards copy 1 to the bookkeeper.

## ACCOUNTING PROCESSOR

1. Receives daily from the General Manager copy 1 of the Billing and Adjustment Memo, if any. Checks the correctness of account distribution and post adjustment to the customer ledger card. At the end of the month, prepares the monthly billing summary.
2. Prepares Journal Voucher in two copies for net adjustment during the month.
3. Files the Billing Adjustment Memo and Monthly Adjustment Summary with the original copy of the approved Journal Voucher.



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

Figure 8 - Procedure for the Payment of Water Bills in the Main Office

## III. CASHIER COLLECTION PROCEDURE

### *Cashier Collection Detailed Procedure*

#### GENERAL MANAGER

- A. Receipt of Guaranty Deposit for future Water Consumption, Installation Fee, Tapping Fee and Reconnection
  - 1. Receives from service applicant copies 1 and 2 of the **Service-Application and Construction Order** which indicates an assessment of fees. Receives payment from service applicant; counts money and places in cash box.
  - 2. Issues **Official Receipt** in 3 copies and gives 1 copy to the service applicant.
  
- B. Receipt of the office bill collector's collection
  - 1. At the end of the day, receives from the office bill collector her daily collections together with all three copies of the Daily Collector's Report and copy 2 of paid water bills. Counts collections and reconciles with total in the Daily Collector's Report. This includes Bank Collection as reported by the bill collector.
  - 2. Issue official receipt in three copies. Acknowledges receipt of collection by signing the daily collector's report and indicating the official receipt number.
  - 3. Distributes copies of the documents as follows:
    - Copy 1 of official receipt – to office bill collector
    - Copy 2 of paid water bills and all two copies of the Daily Collector's Report - To General Manager
  
- C. Refunds of excess cash advances and other miscellaneous collections
  - Receives payment from payer with an explanation as to the purpose of the payment. Issues official receipt in three copies and gives the original to the payer.
  
- D. Preparation of Cashier's Collection Summary
  - 1. Based on copies of the official receipt prepares Cashier's Collection Summary in two copies.
  - 2. Forwards to the bookkeeper copy 1 of the Cashier's Collection Summary together with 2 copy of the official receipt; Files copy 2 of the Cashier's Collection Summary and copy 3 of the official receipt.

## N. PROVISION OF MAINTENANCE SERVICE

### Who can avail the service?

- Concessionaires who have complaints on:
  - a. Dirty water
  - b. Low pressure
  - c. Leakage
  - d. Defective meters and valves

### Requirements:

- Accomplished Request Form

### Schedule of Service Availability:

- Monday to Friday : 8:00 AM to 5:00 PM

### Fees:

- Depends on the plumbing materials needed

How to avail the Service:

STEP	CLIENT	SERVICE PROVIDER	DURATION OF ACTION	PERSON-IN-CHARGE
1	Proceed to the Dingras Water District Office and report complaint	Proceed immediately on the area verification and repair	Depends on the accessibility of the area	Plumber C

Table 12 - Procedure for the Provision of Maintenance

### I. SERVICE APPLICATION PROCEDURE

*Service Application Detailed Procedure*

#### CUSTOMER SERVICE ASSISTANT

1. Receives request for a service connection from service applicant.

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

2. Notes down applicants name and address; verifies against records as to whether or not applicant has any outstanding account with the District. If applicant is applying for a reconnection of a service previously closed, due to delinquency, require concessionaire to settle the old account and pay the necessary fees and charges. If the applicant has an old record without outstanding balance, count the number of years from disconnection date. If it is 10 years and above it will be automatically charge as a new application, less than 10 years it will be reconnection.
3. Write name and address of the applicant at the bulletin board for the utility man/water reader/driver mechanic to inspect the propose service and verification as to whether the applicant's plumbing installations are ready for and the availability or non-availability of the applicants plumbing installation. As much as possible, the meter reader/utility man/ driver mechanic will make sure that the service is always ready for connections informing the applicant's risk as to the payments of materials to be used.
4. If service is adequate and service applicant's plumbing installation is ready for connection to the system, let the applicant sign the Water Service Contract, ask the utility man the estimated materials to be use, and compute for the total of charges.
5. Files the Water Service Contract.

## **ADMINISTRATIVE SERVICES AIDE**

1. Records the newly installed service connection in the Customer Ledger Card. Fills out a meter reading card for the new account.
2. Assigns account number to the customer ledger card and meter reading card based on area where service is located. Files customer ledger card in customer ledger file and the meter reading card in the meter reading book.
3. Updates the master list of service connections be recording the details of the new connections.
4. Records account number in the Customer Accounts Number book.

## **DRIVER MECHANIC/UTILITY WORKER**

1. Goes to the field and investigates adequacy of service applied for and availability of plumbing installation for connection to the system. Estimates materials will used.
2. Prepares materials to be used and record it on the materials logbook, indicating the date of installation, meter reading.
3. Goes to service location and install the service connection.
4. Inform the Customer Service assistant that the installation is done.



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

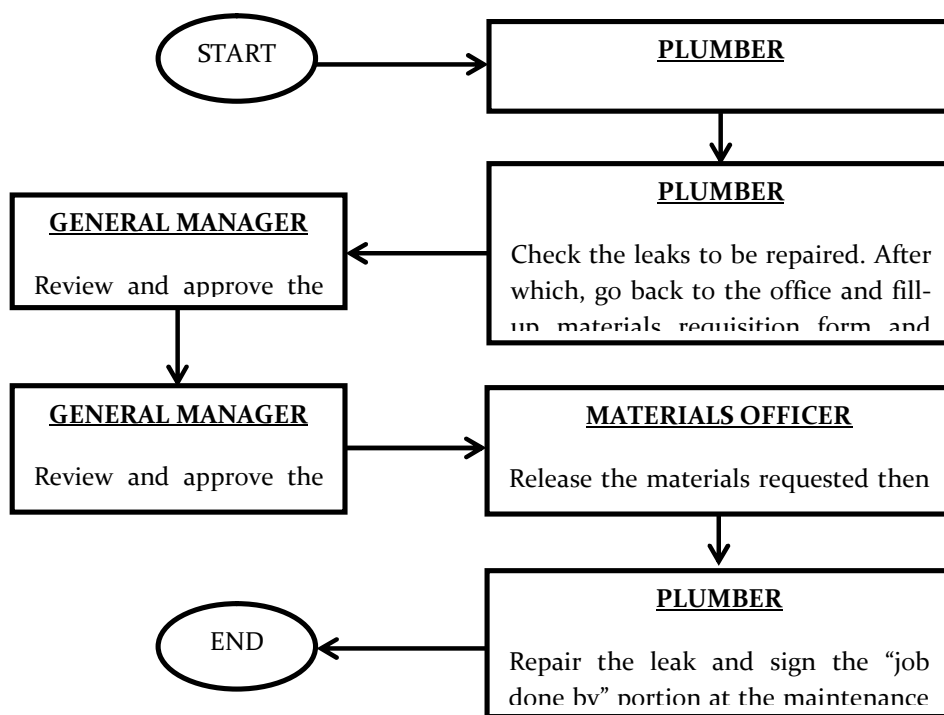


Figure 9 - Procedure for the Provision of Maintenance

The service request form can be seen in Appendix A.

## II. REPAIRING PIPE LEAKS

Leaks in water mains should be fixed as soon as they are detected. Once the leak is pinpointed, the water in the isolated main must be removed. The repair job then consists of sealing the leaks and/or replacing the defective pipe section. The different methods of fixing leaks are as follows:

- Using Epoxy (for Small Leaks)
  - Dry the surface of the area to be repaired;
  - File the surface to make it rough, and slightly enlarge the crack or hole;
  - Apply the epoxy, forcing some of it in to the crack or hole to produce a seal;
  - Normally, the epoxy will set in 2 to 4 hours before the pipe can be disinfected and put back into service. However, be sure to check the directions for use

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

of the epoxy as some types may require more or less time.

- Using Sleeve Type Coupling
  - Put a split sleeve/repair clamp around the leak opening
- Using Strips from the Inner Tube (“Interior”) of a Rubber Tire
  - In emergency work when no other repair materials are available, cut a discarded inner tube of a rubber tire into strips and wind the strong, flexible rubber strips tightly around the pipe to cover the leak and its surrounding surfaces.
- After the Leak is Repaired
  - Open the control valve to allow water to flow into the repaired section;
  - Observe carefully to verify if the leak is completely sealed;
  - After sealing, backfill the excavation and restore the surface to its former condition;
  - Apply the disinfection process.

### III. REPLACING DAMAGED SECTION OF PIPELINES

When the damage in a certain section of a water main is extensive, repair may involve cutting off and replacing the damaged section. The procedures for repairs are as follows:

- For Galvanized Iron (G.I.) Pipes
  - Isolate the defective section by closing appropriate control valves;
  - Excavate the water main;
  - Determine the exact location of the leak;
  - Cut the defective portion of the water main;
  - If a nipple of appropriate length is not available, prepare a substitute nipple using a short pipe of the same kind, diameter and length as the cut off defective pipe;
  - Thread the ends of pipe to be joined;
  - Install G.I. coupling and union parts;
  - Assemble them as shown in Figure 10;
  - Open the control valve to allow water to flow into the repaired section. Observe carefully if the repaired section is not leaking;

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

- If there is no more leak, backfill the excavation and restore the surface to its former condition;
- Disinfect the repaired section

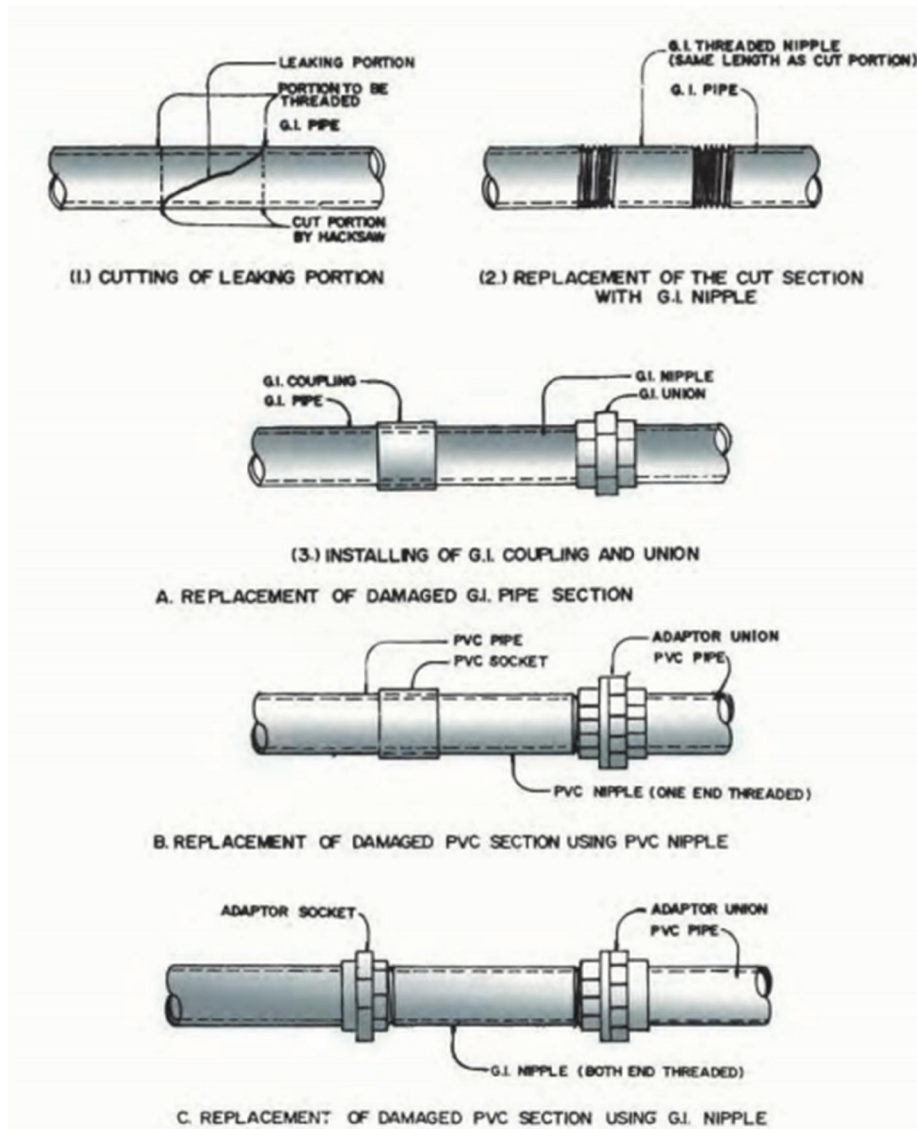


Figure 10 - GI Pipe Repairs

- For Polyvinyl Chloride (PVC) Pipes
  - Isolate the defective section by closing the appropriate control valves;
  - Excavate the water main;
  - Pinpoint the leak;



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

- Measure and cut the defective portion of the pipeline. The length of the pipe cut should have an equivalent commercially available threaded nipple;
  - Install the PVC socket and adaptor union;
  - Join the two cut portions of the water main with the nipple in between. (In case PVC threaded nipple is not available, use the equivalent G.I. threaded nipple);
  - Open the control valve to allow water to flow into the repaired section and observe if it is not leaking;
  - If there is no more leak, backfill the excavation and restore the surface to its former condition;
  - Disinfect the repaired section
- For Polybutylene (PB) and Polyethylene (PE) Pipes
- Isolate the defective section by closing the appropriate valves and excavate main;
  - Cut the defective portion of the water main;
  - Check if the two separate ends of the cut can be pulled together to be joined. This is usually possible because PB and PE pipes are laid in serpentine fashion. Otherwise, a small connecting section must be inserted;
  - Join the 2 separated ends. For PB, use the flaring method. For PE pipes, use the butt-welding method;
  - Open the control valve to allow water to flow and observe for leaks;
  - Backfill and restore surface to its former condition;
  - Disinfect the repaired section.

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

## O. METER READING, BILLING, AND COLLECTION

### I. METER READING

1. Water meters are read monthly in each service area on every last day of the month. If the reading date falls on Sunday. Services in a service area are grouped per barangay to achieve a system whereby water meters of an area are read within a period of one day, after taking into account the average number of water meters which can be read in a day's time.
2. In case of any service complaints from the concessionaire, the meter reader investigates the complaints and immediately sets out to correct the defect. However, if defect needs the services of a serviceman, the meter reader notes down the defect or service complaint in a service request.
3. Any service defect noted which is not covered by a complaint from the concessionaire is reported separately in a Maintenance Order form. This form is also used to initiate action on a routinely maintenance and testing of installed water meters and for documenting water meters dismantled as a result of the concessionaires failure to pay the water bills within the time allotted.
4. The meter reader informs the concessionaire of the amount consumed and its corresponding peso cost. Any material fluctuation in the consumption should be investigated by making a second reading, while still on the site. After indicating the value of the consumption on copy 3 of the preaddressed bill, the meter reader gives it to the concessionaire for his information.

### METER READING PROCEDURE

#### *Meter Reading Detailed Procedure*

### DRIVER MECHANIC/UTILITY WORKER

1. Based on the schedule for the Barangay assignment during the period, receives from the Billing Collection Clerk the following:
  - **Meter Reading Cards** grouped by Barangay and Book.
  - **Copy 3** of water bills which correspond to the service connections scheduled to be read during the day (water bills are preaddressed with previous reading and amount of arrearages, if any, indicated thereon).
2. Test checks of quantity Meter reading cards against the number of service connections indicated on the master list of service connections. Any torn or damaged card should be replaced immediately.
3. Obtains blank copies of **Maintenance Order**; brings these together with the

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

Meter Reading Book, copy of the corresponding water bills and table of rates to the concessionaire's service location.

4. Observes the condition of the service connection and watches out for any service defect; ensures that District regulations are not violated.
5. Receives complains from concessionaires on defects of the service connection and conducts preliminary investigations. If the defects need further corrections or repairs, indicates the defect in a Maintenance Order. This form will also be used to initiate actions on routinely maintenance of installed water meters.
6. Reads meters and indicates the reading on the Meter Reading Card and on copy 3 of the corresponding water bill.
7. Computes consumption and indicates the results on copy 3 of the water bill and on the Meter Reading Card; compares with last month's consumption as shown in the Meter Reading Card. Rereads the Water Meter if variation between last month and present consumption is substantial increase or decrease in consumption.
8. Based on the table of rate, indicates corresponding peso amount to given consumption on copy 3 of the water bill and on the meter reading card. Initials water bill and gives the same to concessionaire. If nobody is home leave, the bill in a place where it is safe and really noticeable.
9. Upon completion of reading one meter reading book, submits it together with the maintenance orders to billing and collection clerk.

## II. BILLING

1. Water bills are prepared not later than the day prior to meter reading. Water bills prepared for concessionaires belonging to one barangay are checked for completeness against the total number of connections. Any discrepancy between the number of bills prepared and the number of service connections shown in the meter reading book are investigated.
2. Completed water bills are forwarded through the General Manager to the bill collectors at the end of the day.
3. Daily billing summary is prepared for all water bills issued during the day. This summary which is prepared jointly by the Customer Service Assistant and the Administrative Services Aide, and is used as basis for recording the accounts receivables and the corresponding income accounts in the General Ledger. This will also serve as reference by the Accounting Processor in the recording of Customer's account in the Customer's Ledger Cards as the case maybe.
4. Adjustments are made for the contested bills. Any adjustment in billing is approved by the General Manager and documented by a Billing Adjustment Memo. All memos issued are summarized monthly for recording in the General Ledger and in the Customer Ledger Cards.



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

## BILLING PROCEDURE

### *Billing Detailed Procedures*

#### **CUSTOMER SERVICE ASSISTANT**

1. Receives daily from Utility Man (as meter reader) the **Meter Reading Book** with the meter readings, consumption and peso amounts indicated thereon.
2. Test checks computation in the Meter Reading Book; checks correctness of peso amounts against the table rates.
3. Completes the preparation of copy 1 and 2 of the water bills by indicating thereon the current reading, consumption, peso amount and other charges, if any totals the bills up to “Total Charges” only. Late payment collection charges (penalty charge) will be added when the bills become overdue.
4. One day after due date, indicates on both copies and on copies 2 overdue bills paid by the returned checks late payment collection charges and indicates total amount due.
5. Prepares an itemized **Daily Billing Report** in two copies, listing the individual consumers and their corresponding include the breakdown of metered sales which shows the total consumption in cubic meters, the amount of metered sales and the number of consumers per category.

Not later than the day before the scheduled meter reading, the Billing and Collection Clerk pre-addresses the water bills in three copies and indicates thereon previous reading and amount arrearages, if any; copy 3 of the preaddressed water bills are given to Utility man (as meter reader) before making his readings. After reading, Meter Reader notes down on the corresponding bills the reading made, consumption and peso amount. He then hands his tentative bills to the concessionaire.

In case the credits for the bills issued are the other than metered and unmetered sales accounts, the “Sundries” columns are to be used for recording those credits. **Only current month’s billing and penalty charges should be included in the daily Billing Report.**

6. Submits copies 1 and 2 of the Daily Billing report and Water Bills including overdue bills and the accompanying adding machine tape to the General Manager.
7. Receives from the General Manager, copy 2 of the Daily Billing Report and copies 1 and 2 of water bills.

#### **GENERAL MANAGER**



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

1. Receives daily from the billing and collection clerk copies 1 and 2 of the Daily Billing Report and water bills, including overdue bills, and the accompanying adding machine tapes. Accounts for the numerical sequence of bills issued; refers to previous Daily Billing Report for the number of the bills issued during the previous billing day.
2. For water bills issued during the day, checks the correctness of the amounts reported in daily billing report by adding current water billings and other current charges shown on the accompanying water bills. Counts water bills and compares with the quantity as reported in the report. Sees to it that the number of bills for each zone tallies with the number of concessionaires in the master list of service connection.
3. Test checks consumption and peso amount billed against the Meter Reading cards. Particular attention should be given to accounts that's Customer Ledger Cards show substantial fluctuation in monthly consumption volume.
4. For overdue water bills, checks the correctness of the total amount of penalty charges reported in the daily Reading Report by adding the penalty charges shown in the accompanying bills. Adds also the amounts including the penalty charges of the overdue bills wit amount and quantity shown in adding machine tapes of overdue bills received from the billing and collection clerk. Deducts the total amount of penalty charges from the total amount of overdue bills. Compares the net amount and quantity of the overdue bills with the amount and quantity of overdue bills previously returned as shown in the **Collector's Accountability Records** in order to ascertain that all returned overdue bills is accounted for.
5. Posts total quantity and amount of water bills including overdue bills in the Collector's Accountability record and gives copy 1 and 2 of water bills in the Billing and Collection Clerk, requesting him to acknowledge receipts of the bills by signing on the Collector's Accountability Record.
6. Forwards the Bookkeeper copy 1 of the Daily Billing Report and copy 2 to the Billing and Collection Clerk.

## ACCOUNTING PROCESSOR

Receives daily, copy 1 of Billing Report from the General Manager. Records the total of entries in the **Billing Register**. Files Daily Billing Report.

## ADMINISTRATIVE SERVICES AIDE

1. Obtains from file the **Customer Ledger Cards**, indicates on the Customer Ledger Card the date of meter reading, meter reading, consumption and peso amount as shown in the daily Billing report plus other charges, if any. Secures the Ledger Cards of delinquent customers and records thereon the late

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

payment collection charge by noting the date of billing, bill number and penalty charge in the “Particulars” column, and amount in the “Billing” column. Files this ledger cards.

## III. COLLECTION

1. The collection of water bills is done at the District Office. Water bills collected at the district are signed by the Customer Service assistant or the assigned bill collector. Copy 1 of the validated water bill serves as the Official receipt and is given to the concessionaire to acknowledge.
2. A collector’s official receipt is issued on the following:
  - Partial payments of water bills
  - Advance payments of concessionaires particularly in case where the water bills are not yet turned over to the Customer Service assistant for collection. The Customer Service Assistant and Administrative Services Aide indicates the COR No. and date on the corresponding water bill before this bill is turned over to the General Manager as part of bill prepared during the day.
  - Collection of bills previously paid by returned checks since copies 1 of the bills were already given to the customers during the first payment.
3. The due date of the monthly bills of a particular Barangay is indicated on the copies of water bills for the information of the concessionaires and as reference for the imposition of penalty charges which is 25% of the current bill.
4. For water bills which are not paid at the office, the customer service assistant and administrative services aide indicates on the delinquent bill a late payment collection charge (penalty charge) which will be added to and collected together with one amount of the outstanding bill.
5. Cash accountable employees, the General Manager (as cashier) and the Customer Service Assistant, are covered by an adequate amount of fidelity bonds.
6. All collections of the customer service assistant are turned over to the Cashier daily and deposited to the LANDBANK – Laoag Branch as need arises. Check payment of concessionaires received which are not honoured by the bank will be presented to the concessionaire for replacement in cash.

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

## APPENDICES

DINGRAS WATER DISTRICT SERVICE REQUEST			
CONCESSIONAIRE: _____		No. _____	
SERVICE ADDRESS: _____			
REQUEST RECEIVED BY: _____	APPROVED BY: _____	COMPLETED ACTION REVIEWED BY: _____	
DATE			
<input type="checkbox"/> DIRTY WATER	<input type="checkbox"/> NO WATER	<input type="checkbox"/> HIGH CONSUMPTION	ACTION TAKEN: _____ _____ _____
<input type="checkbox"/> TASTE OR ODOR	<input type="checkbox"/> HIGH PRESSURE	<input type="checkbox"/> REREAD	
<input type="checkbox"/> LOW PRESSURE	<input type="checkbox"/> METER LEAK	<input type="checkbox"/> RECONNECTION	
<input type="checkbox"/> NEW CONNECTION	<input type="checkbox"/> DISCONNECTION		
OTHERS (Specify) _____			BY: _____
_____			METER READER/PLUMBER
_____			TO CONCESSIONAIRE:
_____			Did the action taken
_____			satisfy your request?
_____			<input type="checkbox"/> YES
_____			<input type="checkbox"/> NO
_____			SIGNATURE

Annex 1 - Service Request Form

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

**DINGRAS WATER DISTRICT**  
**Dingras, Ilocos Norte**

SERVICE/MAINTENANCE REQUEST/ORDER # \_\_\_\_\_

Name: \_\_\_\_\_ Acct. No. \_\_\_\_\_  
Address: \_\_\_\_\_

**MAINTENANCE/SERVICE REQUESTED:**

<input type="checkbox"/> install new water connection	<input type="checkbox"/> inspect water meter
<input type="checkbox"/> re-open water connection	<input checked="" type="checkbox"/> inspect service line
<input type="checkbox"/> transfer tapping	<input type="checkbox"/> inspect mainline pipe
<input type="checkbox"/> others (please specify) _____	

Requested by: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK DONE:**

<input type="checkbox"/> install new water connection	<input type="checkbox"/> change water meter
<input type="checkbox"/> re-open water connection	<input type="checkbox"/> inspect water meter
<input type="checkbox"/> others ) _____	<input type="checkbox"/> re-read water meter
<input type="checkbox"/> repair pumping equipment (specify) _____	<input type="checkbox"/> transfer tapping
<input type="checkbox"/> repair service line leak (specify) _____	
<input type="checkbox"/> repair mainline line leak (specify) _____	

**MATERIALS USED:**  
\_\_\_\_\_  
\_\_\_\_\_

**WORK/JOB DONE BY:** \_\_\_\_\_ **IN THE PRESENCE OF:** \_\_\_\_\_  
MAINTENANCE CREW                      DATE                      CONCESSIONAIRE/REPRESENTATIVE

Annex 2 Service/ Maintenance/ Request/ Order Form



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL



*Dingras Water District*  
**DINGRAS ILOCOS NORTE**  
TEL. NO. (077)600-0442

## APPLICATION AND CONTRACT FOR WATER SERVICES

Application is hereby made for water service to Dingras Water District for purposes in accordance with its existing rules and regulation now in force or maybe enforces later.

In addition, I hereby agreed to the following:

### TERMS AND CONDITIONS

1. To pay the cost of water meter ONE THOUSAND TWO HUNDRED EIGHT PESOS (P 1,208.00)
2. To pay a miscellaneous and maintenance fee of TWO HUNDRED FIFTY PESOS (P250.00)
3. To provide materials needed for the service connection.
4. That the payment of water service shall be to Dingras Water District or to its designated collection officer upon receipt of the water bill or within twenty (20) days after issuance thereof. Failure to pay shall mean delinquency and a surcharge of TEN PERCENT (10%) of the bill shall be added to the amount payable and delinquency of payment for twenty (20) days shall mean outright disconnection without prior notice.
5. That if I desire to discontinue my water service, I should file due notice to the Dingras Water District.
6. That if water services has been disconnected, no reconnection be done except upon payment of all accounts plus additional charge of THREE HUNDRED PESOS ( P300.00).
7. That the meter shall be installed outside my property line as indicated in the sketch,. I shall at my expenses provide for it a tamper proof protection box. That I shall also see to it that the said water meter to properly safeguard and that any repair for any damage thereof made by Dingras Water District shall be at my expenses (case to case basis).
8. That I shall not allow any sub connection or tapping from my water service without the authority of the Dingras Water District.
9. That the Dingras Water District shall not be responsible for any leak or defect in any water pipe, hose, water conduit, faucet valves or other connections at any point within my premises. It shall not also be held responsible for low pressure of water service interruption due to circumstances beyond it control. However, it may disconnect service upon violation of its laws and regulations.
10. That the Dingras Water District shall have the sole authority to relocate or transfer water meters and service lines including pull out of tampered meters.
11. That I shall allow representatives of Dingras Water District to enter to my premises anytime to enable them to perform their official duties.
12. That I shall notify the Dingras water District when as owner, I transfer the ownership of the property or when as a tenant as I leave the premises.
13. That the owner of the rented building served by Dingras Water District shall also be responsible for this contract.

# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

14. Those inactive connections for one (1) year and above will be closed at the tapping point and ownership of the line to be turned-over to the Dingras Water District
15. That a clearance of account be a pre-requisite to the approval of this application.

Location of service : \_\_\_\_\_  
Connection Request: \_\_\_\_\_ Size: \_\_\_\_\_  
Water Meter Make \_\_\_\_\_ Size: \_\_\_\_\_ No. \_\_\_\_\_ Remarks \_\_\_\_\_  
Bill to: \_\_\_\_\_ Name of Spouse: \_\_\_\_\_  
CTC No: \_\_\_\_\_ Place of Issue \_\_\_\_\_ Date of issue \_\_\_\_\_  
Collection Address: \_\_\_\_\_  
Business Address: \_\_\_\_\_  
Date of application: \_\_\_\_\_

\_\_\_\_\_  
Applicant Signature

\_\_\_\_\_  
Owner of the Building  
Signature over Printed Name

Date \_\_\_\_\_ Cashier \_\_\_\_\_

Recommending Approval:

\_\_\_\_\_  
Manager, Commercial Division

APPROVED:

\_\_\_\_\_  
General Manager

Connection Completed: \_\_\_\_\_

Date meter Mounted: \_\_\_\_\_

Reading Meter: \_\_\_\_\_

\_\_\_\_\_  
Plumber

SUBSCRIBED AND SWORN TO before me on this \_\_\_\_\_ day of \_\_\_\_\_, 2015, affiant(s)

Annex 3 - Application and Contract for Water Services



# DINGRAS WATER DISTRICT – OPERATIONS MANUAL

## REFERENCES

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