



Catbalogan Water District
Water Safety Plan (WSP)

**Revision No 3.0 Dated 04 JULY 2022
(As Amended dated 27 December 2022)**

Contents

Contents

| | | |
|-----------|--|-----------|
| 1. | INTRODUCTION | 1 |
| 1.1 | BACKGROUND | 1 |
| 1.2 | MISSION, VISION AND CORE VALUES..... | 1 |
| 2. | WSP TEAM..... | 2 |
| 2.1 | WSP TEAM COMPOSITION | 2 |
| 2.2 | WSP TEAM MEMBERS | 2 |
| 2.3 | DUTIES AND RESPONSIBILITIES | 4 |
| 2.4 | STAKEHOLDERS | 4 |
| 3. | SYSTEM DESCRIPTION..... | 8 |
| 3.1 | GENERAL INFORMATION ON THE SUPPLIER | 8 |
| 3.2 | SOURCE OF WATER: CATCHMENT AND EXTRACTION FROM SOURCE..... | 11 |
| 3.3 | FLOW DIAGRAM..... | 14 |
| 3.4 | TREATMENT PROCESSES | 16 |
| 3.5 | DISTRIBUTION SYSTEM | 17 |
| 3.6 | WATER QUALITY REQUIREMENTS | 17 |
| 3.7 | DELIVERY POINT, INTENDED USERS OF WATER AND INTENDED USES OF THE WATER..... | 19 |
| 3.8 | CURRENT DELIVERED-WATER QUALITY..... | 19 |
| 3.9 | PERSISTENT PROBLEMS..... | 19 |
| 4. | RISK ASSESSMENTS, HAZARD TABLE AND EXISTING CONTROL MEASURES..... | 20 |
| 4.1 | RISK ASSESSMENT METHODOLOGY..... | 20 |
| 4.2 | HAZARD/RISK TABLE AND EXISTING CONTROLS | 20 |
| 4.3 | PROPOSED CONTROL MEASURES..... | 29 |
| 5. | IMPROVEMENT PLANS..... | 36 |
| 6. | OPERATIONAL MONITORING AND CORRECTIVE ACTIONS OF CONTROL MEASURES | 43 |
| 7. | VERIFICATION PROCEDURES | 46 |
| 7.1 | COMPLIANCE MONITORING PLAN CONSISTENT WITH WATER QUALITY TARGETS | 46 |
| 7.2 | VERIFICATION MONITORING PROGRAM | 47 |
| 7.3 | INTERNAL AND EXTERNAL AUDIT PLANS | 48 |

| | | |
|------------|--|-----------|
| 8. | MANAGEMENT PROCEDURES..... | 49 |
| 8.1 | CORRECTIVE ACTIONS – FOR NORMAL OPERATION ACTIVITIES..... | 49 |
| 8.2 | RESPONSE PLANS – FOR EMERGENCY OPERATION ACTIVITIES..... | 49 |
| 9. | SUPPORTING PROGRAMS..... | 52 |
| 9.1 | Plan for Supporting Programmes..... | 52 |
| 10. | PERIODIC REVIEW OF WSP..... | 53 |
| 11. | REVISION OF WSP FOLLOWING AN INCIDENT..... | 53 |
| 12. | ANNEXES..... | 54 |

| | |
|----------|--|
| Annex A. | Board Resolution No. 70, series of 2016 (Resolution Approving the Support in the Preparation and Development of the Water Safety Plan (WSP) for Catbalogan Water District (CWD) and its Implementing Activities) |
| Annex B. | District Memorandum No. 146 dated March 15, 2021 (Revised Composition of the Water Safety Plan Committee) |
| Annex C. | District Memorandum No. 145 dated March 15, 2021 (Attendance on Water Safety Plan Workshop) |
| Annex D. | Board Resolution No. 23, series of 2021 (Resolution Approving the Adoption of the 2 nd Revision of Water Safety Plan of Catbalogan Water District) |
| Annex E. | Improvement Plans |
| Annex F. | Transmission and Distribution Mains |
| Annex G. | Operation's Manual |
| Annex H. | CWD Disaster Risk Reduction Management Plan (CWD –DRRMP) |
| Annex I. | Board Resolution No. 56, series of 2018 (Resolution Approving the Policy of Safeguarding and Securing Chemicals, Equipment and other Combustible Materials of the District) |
| Annex J. | Implementing Rules and Regulations (IRR) of BOD Resolution No. 56, series of 2018 (Policy of Safeguarding and Securing Chemicals, Equipment and other Combustible Materials of the District) |
| Annex K. | Manual on First Aid for Chlorine-Related Injuries |

DOCUMENT HISTORY

This page records the changes made to the document since its inception. Every time a revision is made to the document.

| Revision Number and Date | Which sections of the document were revised |
|---------------------------|---|
| Rev 0.0 Date 01 Sep, 2016 | Issue of first revision – all sections new |
| Rev 1.0 Date 03 Jan. 2017 | Inclusion of: |

| | |
|----------------------------|--|
| | - Office Memorandum of WSP Team meetings |
| | - Board Resolution adopting the CWD WSP |
| | - Activity on monitoring of customer satisfaction |
| Rev 2.0 Date 01 March 2021 | Updating of Data and Information. Inclusion of: |
| | 2. WSP Team |
| | - WSP Team Composition |
| | - WSP Team Members |
| | - WSP Organogram |
| | - WSP Stakeholder Identification and Interaction |
| | 3. System Description |
| | - General Information |
| | - Area of Coverage |
| | - Household Coverage |
| | - Transmission and Distribution Pipelines |
| | - WSC Classification and Tariff Charges |
| | - Source of Water: Catchment & Extraction from Source |
| | - Distribution System |
| | - Water Quality Requirements |
| | - Delivery Point, Intended Users of Water and Intended Uses of the Water |
| | 4. Risk Assessments, Hazard Table & Existing Control Measures |
| | - Hazard/Risk Table and Existing Controls |
| | - Proposed Control Measures |
| | 5. Improvement Plans |
| | 6. Operational Monitoring and Corrective Action of Control Measures |
| | 7. Verification Procedures |
| | - Compliance Monitoring Plans |
| | - Verification Monitoring Program |
| | - External Audit Plans |
| | 8. Management Procedures |
| | 9. Supporting Programs |

| | |
|---------------------------|---|
| | 10. Review Procedures |
| Rev 3.0 Date 04 July 2022 | Updating of Data and Information. Inclusion of: |
| | 2. WSP Team |
| | - WSP Team Members |
| | - WSP Organogram |
| | 7. Verification Procedures |
| | - Internal and External Audit Plans |
| | 8. Management Procedures |
| | - Corrective Actions |
| | - Response Plans |
| | 10. Periodic Review of WSP |
| | 11. Revision of WSP Following an Incident |

1. INTRODUCTION

1.1 BACKGROUND

Guided by its vision which is “to be an excellent water utility providing potable and sustainable water with efficient and economically viable services and ensuring the preservation of our natural resources”, Catbalogan Water District (CWD) develop this Water Safety Plan (WSP) to ensure that the quality of drinking water supplied by CWD can meet the health based standards even in emergency situations.

Water Safety Plan is a comprehensive approach that encompasses all steps from source to consumers by identifying the hazards that may cause hazardous events. The conceptual framework of the plan describes in details the water sources, the treatment process down to the distribution networks and up to the consumer’s tap. This is a proactive approach in addressing issues that affects water quantity and quality. The WSP will act as a guide in the continuous improvement projects to ensure health and safety of the consumer of the water district.

The plan was modelled after the World Health Organization (WHO) which recommends identifying residual risks to water safety, determining the existing and proposed control measures, and develop improvement plan based on the significant risks identified. Correct details in operational monitoring of the WSP are also indicated to ensure that the water supply system components and control measures continue to work effectively. Verification process will also confirm that the drinking water quality standards are being met, and consumers are satisfied. The said process will also validate that the WSP is complete and is working effectively.

1.2 MISSION, VISION AND CORE VALUES

- 1.2.1 Mission: We are committed to be a customer service-oriented utility that is concerned with the preservation of our natural resources
- 1.2.2 Vision: To be an excellent water utility providing potable and sustainable water with efficient and economically viable service and ensuring the preservation of our natural resources
- 1.2.3 Core Values: Commitment, Teamwork, & Environmental Stewardship

2. WSP TEAM

2.1 WSP TEAM COMPOSITION

CWD Board of Directors and top management showed their support for the development of WSP and its implementation activities through a signed Board Resolution no. 23 dated April 22, 2021 (See attached Annex A).

The Revised WSP team was form to lead the development and implementation of the identified approach that is connected to the safety of the water supply.

The core team that was assembled have knowledge and experience in all aspects of the water supply system and sufficient decision-making authority to develop and implement the WSP.

Table 2-1. Skills needed to complete a WSP team

| | | |
|---|---|-------------------------------|
| 1 | Technical expertise on operation and maintenance of | |
| | A | Source |
| | B | Storage |
| | C | Treatment |
| | D | Distribution |
| 2 | Provide operational support for the WSP in terms of | |
| | A | Administrative |
| | B | Financing |
| | C | Technical |
| 3 | Capable of communicating the WSP objectives and outcomes | |
| | A | Inside the WD |
| | B | Outside the WD |
| 4 | Understand water quality targets to be met | |
| 5 | Understand the impact of proposed water quality controls on the environment | |
| 6 | Knows the regulation | |
| 7 | Familiar with training and awareness programmes | |
| 8 | With authority | |
| 9 | Other team members | |
| | A | Resource persons |
| | B | Coordinator |
| | C | Secretariat |
| | D | Documentation committee/staff |

2.2 WSP TEAM MEMBERS

Using table 2-1, the team members' expertise were identified and was plotted in table 2-2. As much as the required skills needed to complete a WSP team, table 2-2 shows that the District has people that could met the needed skills. Table 2-2 shows the list of members, its job title, contact information, role in the water safety plan team, and its expertise.

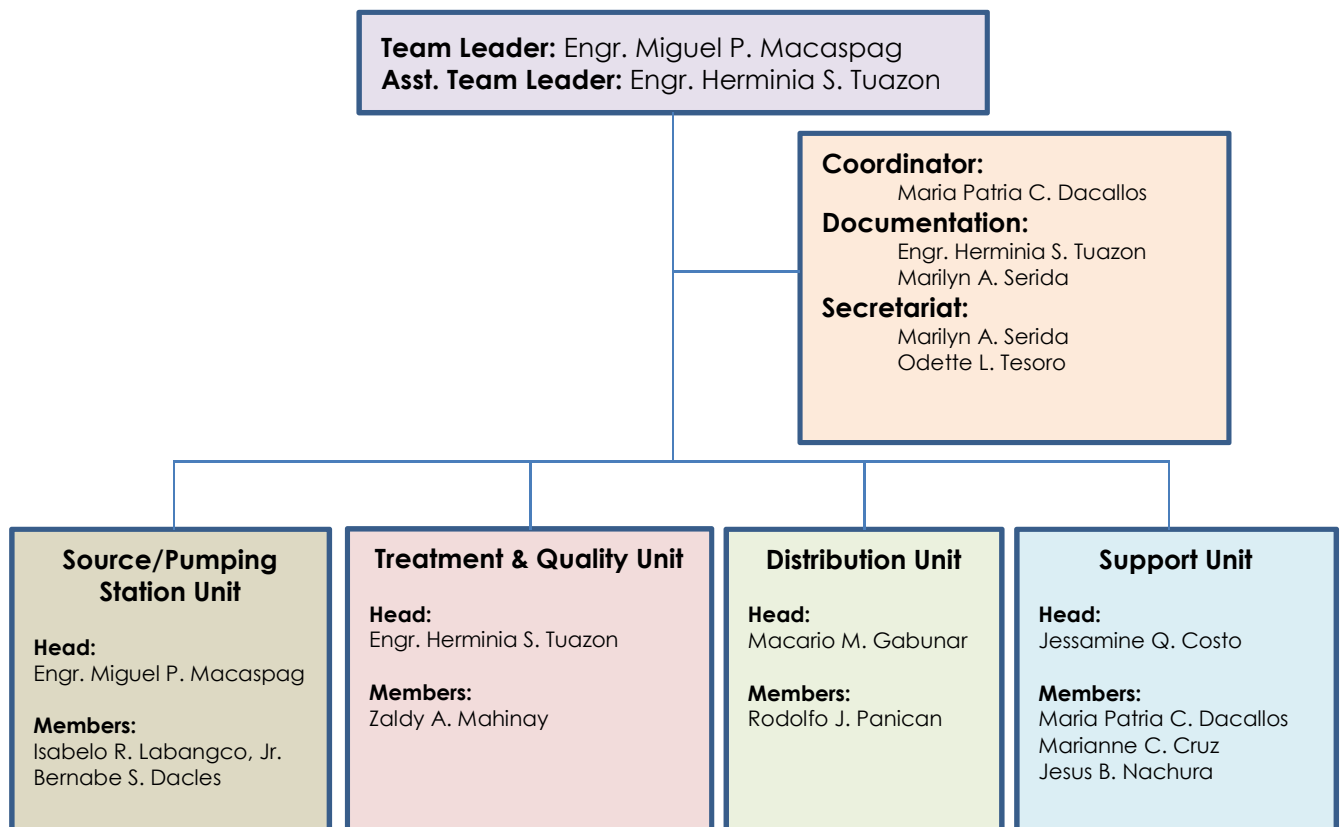
Table 2-2. WSP Team Members

| Name | Role in the WSP Team | Expertise | | | | | | | | | | | | | | | | | |
|--|---|-----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | | | | 2 | | | 3 | | 4 | 5 | 6 | 7 | 8 | 9 | | | |
| | | a | b | c | d | a | B | c | a | b | | | | | | a | b | c | d |
| Engr. Miguel P. Macaspag Manager – Engineering Division Cell # 0917-707-2643 | 1. Team Leader 2. Head: Source Unit/Pumping Stations | | | | | | | | | | | | | | | | | | |
| Engr. Herminia S. Tuazon Supervising Engineer A Cell #0917-308-6315 | 1. Assistant Team Leader 2. Head: Treatment & Quality Unit 3. Documentation | | | | | | | | | | | | | | | | | | |
| Isabelo R. Labangco Jr. Water Sewerage Maintenance Man B Cell # | 1. Member: Source Unit/Pumping Station | | | | | | | | | | | | | | | | | | |
| Bernabe S. Dacles Water Sewerage Maintenance Man B Cell #: | 1. Member: Source Unit/Pumping Station | | | | | | | | | | | | | | | | | | |
| Zaldy A. Mahinay Laboratory Technician Cell # 0977-441-0054 | 1. Member: Treatment & Quality Unit | | | | | | | | | | | | | | | | | | |
| Macario M. Gabunar Water Sewerage Maintenance Foreman Cell # | 1. Head: Distribution Unit | | | | | | | | | | | | | | | | | | |
| Rodolfo J. Panican Water Sewerage Maintenance Man A Cell # | 1. Member: Distribution Unit | | | | | | | | | | | | | | | | | | |
| Jessamine Q. Costo Manager – Commercial Division Cell #0928-559-6338 | 1. Head: Support Unit – Financial | | | | | | | | | | | | | | | | | | |
| Maria Patria C. Dacallos OIC – Administrative Division Cell # 0920-803-4524 | 1. Member: Support Unit – Human Resource 2. Coordinator | | | | | | | | | | | | | | | | | | |
| Marianne C. Cruz Cashier C Cell #0920-805-9709 | 1. Member: Support Unit – Financial | | | | | | | | | | | | | | | | | | |
| Jesus B. Nachura Accounting Processor B Cell #0977-333-7469 | 1. Member - Support Unit - Financial | | | | | | | | | | | | | | | | | | |
| Marilyn A. Serida Utilities/Customer Service Assistant C Cell # 0918-480-3232 | 1. Documentation 2. Secretariat | | | | | | | | | | | | | | | | | | |
| Odetta L. Tesoro Utilities/Customer Service Assistant C Cell #0995-123-2488 | 1. Secretariat | | | | | | | | | | | | | | | | | | |

2.3 DUTIES AND RESPONSIBILITIES

- 2.3.1 The team leader should drive the project and ensure focus.
- 2.3.2 The team leader must use his interpersonal skills to ensure project implementation and must explore for external support, that includes benchmarking or partnering with other organizations and sources of aid and information.
- 2.3.3 The team will discuss, determine, and define the water supply system, its stakeholders, the hazards of each part of water supply system, the control measures both existing and proposed, the improvement plan to minimize if not eliminate hazardous events.
- 2.3.4 The team is responsible in the monitoring of the effectiveness of the WSP and ensure that corrective actions are fully implemented.
- 2.3.5 The team is responsible of the verification process by conducting several verification activities to ensure that the WSP is effectively implemented to deal with water quality issues.
- 2.3.6 Ensure an open communication with the management and its stakeholders on activities that will affect quality of water.

Figure 1.0 WSP Organogram



2.4 STAKEHOLDERS

Stakeholders play a vital role in bringing quality water to our customers. This part will describe the stakeholders' roles and responsibilities, what component of the water supply the stakeholder is engaged, and the interaction mechanism with the water district.

Table 2-3 WSP Stakeholder identification and Interaction

| Name | Stakeholders | | | | Interaction Mechanism | Record of Interaction |
|--|--|---|------------------------------------|--|---|---|
| | Relationship to Drinking Water Supply Issues | Point of Contact with WSP Team | Point of Contact with Stakeholders | Issues with Drinking Water Supply | | |
| SOURCE | | | | | | |
| Department of Environment & Natural Resources (DENR) | B, F | WSP Team Leader | PENRO/CENRO | 1. Strict implementation of forest protection policies & regulations 2. Strict enforcement of Police Power (Timber Poaching, Kaingin, Charcoal-Making Activities) | P: Periodic Meeting Invitation Letter | Minutes of the Meeting or Attendance or Certificate of Appearance |
| Catbalogan City LGU | B, E | WSP Team Leader | City Mayor | P: Strict implementation of existing ordinance on environment protection | P: Annual Meeting Invitation Letter P: Periodic follow-up on the implementation of ordinances | Minutes of the Meeting or Attendance or Certificate of Appearance Letter Request or Logbook or Certificate of Appearance |
| City Agriculture Office | B | WSP Team Leader | Head of Office | Strict implementation of existing regulations on the use of pesticides Organic Fertilizer; Livelihood Trainings; Training on proper planting of trees | P: Annual Meeting | Minutes of the Meeting or Attendance or Certificate of Appearance Training Proposal; Attendance |
| Barangay/s | A | WSP Team Leader | Barangay Chairman | Waste water run-off during onset of rainy days | P: Scheduled/ Informal Meeting | Minutes of the Meeting or Attendance or Certificate of Appearance |
| Farmers | A | WSP Team Leader | Barangay Chairman, Farmers | Pesticides and human waste run-off to river during onset of rainy days | P: Scheduled/ Informal Meeting | Minutes of the Meeting or Attendance or Certificate of Appearance |
| Armed Forces of the Philippines (AFP) | F | WSP Team Leader | Commanding General | Close coordination with DENR for the apprehension of Timber Poachers, Kaingeros and Charcoal-makers | P: Annual Meeting | Minutes of the Meeting or Attendance or Certificate of Appearance |
| Philippine National Police (PNP) | F | WSP Team Leader | Chief of Police | Close coordination with DENR for the apprehension of Timber Poachers, Kaingeros and Charcoal-makers | P: Semestral Meeting | Minutes of the Meeting or Attendance or Certificate of Appearance |
| Samar Electric Cooperative II (Samelco II) | D | WSP Team Leader | General Manager | Proper coordination of preventive maintenance. Advance notification of power interruption for continuity of water treatment process | E: Advisory thru text and social media P: Monthly Meeting | Screenshots of Notices/Advisory Minutes of the Meeting or Attendance or Certificate of Appearance |
| City Health Office (CHO) | B | WSP Team Leader | City Health Officer | Strict monitoring of proper design of septic tanks. Implementation of Sanitary Code | P: Annual Meeting | Minutes of the Meeting or Attendance or Certificate of Appearance |
| Suppliers/Contractors | D | WSP Team Leader | Proprietor | Supply of materials that adhere to the standard specifications | E: PhilGEPS Posting, Bidding | Purchase Request (PR), Request for Quotation (RFQ), Invitation to Bid |
| Non-Governmental Organizations (NGOs) | G | WSP Team Leader | Chairman/President | Organic Fertilizer; Livelihood Trainings; Training on proper planting of trees | P: Quarterly Meeting | Training Proposal; Attendance |
| DISTRIBUTION | | | | | | |
| City Health Unit (CHU) | B, C | Engineering Division (Division Manager) | Sanitary Officer | Compliance with Philippine National Standard for Drinking Water (PNSDW) Compliance with | E: Provide copy of Daily Laboratory Test Results, Monthly Bacteriological Test Results P: Strict implementation on the laws, | Report on Daily Laboratory Test Result; Daily Chlorine Residual Monitoring Report; Microbiological Test Result for Water Copy of permits |

| | | | | | | |
|---|---------|---|-----------------------------------|--|--|--|
| | | | | Sanitary Code of the Philippines | particularly in the Design & Construction of Septic Tanks | and/or Certification |
| City Engineering Office (CEO) | B, C, A | Engineering Division (Division Manager) | Building Official & City Engineer | Compliance with Sanitary Code of the Philippines Provide necessary permits to CWD for speedy repair/ restoration/ rehabilitation works of leakages Provide advance information regarding implementation of projects that may cause damage to water pipelines | P: Strict implementation of Sanitary and Building Code/ Laws P: Proper coordination before project implementation Confer with authorized personnel, if necessary | Copy of permits and/or Certification Letter Request and Permit Copy of Plans |
| Department of Public Works and Highways (DPWH-2SED) | B, A | Engineering Division (Division Manager) | District Engineer | Provide advance information regarding implementation of projects that may cause damage to water pipelines Provide necessary permits to CWD for speedy repair/ restoration/ rehabilitation works of leakages | Confer with authorized personnel, if necessary P: Proper coordination before project implementation | Copy of Plans Letter Request and Permit Copy of Plans |
| Provincial Engineering Office (PEO) | B, A | Engineering Division (Division Manager) | Provincial Engineer | Provide advance information regarding implementation of projects that may cause damage to water pipelines Provide necessary permits to CWD for speedy repair/ restoration/ rehabilitation works of leakages | Confer with authorized personnel, if necessary P: Proper coordination before project implementation | Copy of Plans Letter Request and Permit |
| Barangay LGU | B, A | Engineering Division (Division Manager) | Barangay Chairman | Provide advance information regarding implementation of projects that may cause damage to water pipelines Provide necessary permits to CWD for speedy repair/ restoration/ rehabilitation works of leakages | Confer with authorized personnel, if necessary P: Proper coordination before project implementation | Copy of Plans Letter Request and Permit |
| Accredited Laboratory Testing Center | D | Laboratory Technician | Laboratory Technician; RMT | Compliance with PNSDW Provide speedy laboratory test results for water samples submitted for various parameters (Physical-Chemical) and Absence/Presence of E.Coli (Bacteriological) for sound and efficient management decision | E: Proper sampling, and handling of water samples for accurate and truthful laboratory test results | Laboratory Test Results |
| TREATMENT | | | | | | |
| City Health Unit (CHU) | B, C | Laboratory Technician | Sanitary Inspector | Compliance with Philippine National Standard for Drinking Water (PNSDW) | P: Assist in gathering and conduct the laboratory tests of water samples, particularly during emergencies | Laboratory Test Results and Investigation Report |
| Accredited Laboratory Testing Center | D | Laboratory Technician | Laboratory Technician; RMT | Compliance with PNSDW Provide speedy laboratory test results for water samples submitted for various parameters (Physical-Chemical) and Absence/Presence of E.Coli (Bacteriological) for sound and efficient management decision | E: Proper sampling, and handling of water samples for accurate and truthful laboratory test results | Laboratory Test Results |

| | | | | | | |
|--|------|---|--------------------------|--|---|---|
| Barangay LGU | B, A | Engineering Division (Division Manager) | Barangay Chairman | Proper coordination with CWD prior to issuance of permits/certification, especially structures built near treatment facilities | P: Letter Request (Approval/Disapproval) | Copy of Letter Request with CWD Concurrence |
| Technically, Financially Capable Suppliers and Contractors (PhilGEPS Registered) | D | BAC Chairman | Proprietor/Sales Manager | Provide materials/supplies that met the standard specifications and delivered within the specified period to avoid interruption of the operation of treatment plant, especially during rainy season and calamities | E: Invitation to Bid and/or Request for Quotation (RFQ); and Bid Notice Abstract (PhilGEPS) | Copy of Purchase Request (PR); Request for Quotation (RFQ); Bid Notice Abstract and Invitation to Bid (ITB) |

Suggested types of Relationship of identified Stakeholder to drinking water supply:

| Types | Particulars |
|-------|---|
| A | Effluent Contributor (Source of contamination, e.g Farmers, dumpsites, landfills) |
| B | Regulator (Government entities implementing regulations) |
| C | Source of Information/Monitoring Entity (Government Entities, NGOs, Private & Academe who monitor and/or maintain information) |
| D | Supplier/Contractor (Water supply providers renders services for the construction, maintenance and/or operation of their facilities) |
| E | Policy-Maker/Legislator (Local, Regional and/or National Government Entities framing policies, rules, regulations and laws) |
| F | Police Authority (Government Entities enforcing regulations and maintaining order) |
| G | Cross-Concern Entity (Entities responsible in constructing, operating and maintaining infrastructures, facilities and services that may have systems that would adversely affect water quality, either directly or indirectly, e.g DPWH, LGUs) |

3. SYSTEM DESCRIPTION

3.1 GENERAL INFORMATION ON THE SUPPLIER

The water supply of the City of Catbalogan is handled and managed by the Catbalogan Water District (CWD), which was initially constructed in 1925 under the management of the local government. It was transferred to the National Waterworks and Sewerage Authority (NAWASA) upon its creation in 1995. In 1969, NAWASA was abolished and the Catbalogan municipal government took over the CWD management.

A Sanguniang Bayan resolution No. 66 was approved in July 5, 1978 creating the Catbalogan Water District (CWD) based on the national policy, the P.D. 198 known as Provincial Water Utilities Act of 1973 favoring local operation and control of water systems; authorizing the formation of local water districts and providing for the government and administration of such districts; chartering a national administration for facilitate improvement of local water utilities; granting said administration such powers as are necessary to optimize public service from water utility operations, and for other purposes. On December 7, 1979 the Local Water Utilities Administration awarded Conditional Certificate of Conformance No. 107 to the CWD.

Currently, Catbalogan Water District is the only water service provider in the city of Catbalogan. Catbalogan Water District is a none-profit oriented and receives no subsidy from the national and local government. The revenue raised is solely from the concessionaires' monthly payments of water bills and other installation costs. Local Water District was declared a Government Owned Controlled Corporation by Supreme Court as of 1992.

The district is currently managed by its General Manager, Engr. Ralph S. Uy. It has three divisions namely: Administrative Division headed by Eusebia Christina Yboa (Division Manager), Commercial Division headed by Jessamine Q. Costo (Officer-in-Charge), and Engineering Division headed by Engr. Miguel P. Macaspag (Division Manager).

The policy making body is composed of five directors representing different sectors. The Chairman is Mrs. Myra Gay M. Tambor (Women Sector), Vice Chairman is Mr. Jose A. Mabulay Jr. (Civic Sector), Secretary/Treasurer is Mr. Pedrito G. Padilla (Education Sector), Rolando T. Ko (Business Sector), and Mr. Vincent C. Navarrete (Professional Sector).

3.1.1 AREA OF COVERAGE

Catbalogan is composed of 57 barangays with 22 barangays classified as upland or island barangays, the remaining 35 barangays are along the carline.

The current service area of CWD is only 45.61% of the total number of barangays or 26 out of 57 barangays. These barangays are Poblacion 1 to 13, San Andres, Canlapwas, San Pablo, Muñoz, Mercedes, Maulong, Guindapunan, Guinsorongan, and Bunu-anan which are Level III; and Darahuway Guti, Darahuway Dako, Payao (Government Facilities), Lagundi are Level I.

Possible expansions of the service coverage are the carline barangays along the highway, namely, San Vicente, Mahayag, Iguid, Silanga, Pupua, Payao, upper portion of Maulong, Lagundi, and Socorro.

3.1.2 HOUSEHOLD COVERAGE

CWD is serving 60% of the total Number of households in the current service area and is projected to increase by 15% by the end of year 2025. (Based on the 2005 Census with estimated 10% increase per year)

3.1.3 TRANSMISSION AND DISTRIBUTION PIPELINES

There are four transmission pipelines originating from the three water sources namely, one from Kulador, two from Masacpasac Spring and another one from Caramayon Spring. However, only two 200mm transmission pipelines are in place from San Andres to the poblacion proper. (See attached Annex G)

The existing transmission lines have a carrying capacity of about 90-120 lps. This was based on the hydraulic analysis of the two 200mm transmission pipelines and actual recorded production.

Transmission and Distribution Pipelines:

| Pipeline ID No. | Pipe Size (diameter) | Pipe Type | Pipe Length (linear meter) | Year Installed | Location |
|--|----------------------|-----------|----------------------------|----------------|--|
| Transmission Pipeline (Caramayon – Masacpasac – Kulador – San Andres) | | | | | |
| 1 | 8"Ø (200mm) | PVC | 430 | 2016 | Caramayon II – Caramayon I |
| 2 | 8"Ø | PVC | 520 | 2016 | Caramayon I – Break Pressure |
| 3 | 8"Ø | PVC | 520 | 2016 | Caramayon I – Break Pressure |
| 4 | 10"Ø (250m) | PVC | 4,700 | 2004 | Break Pressure – Kulador Treatment Plant |
| 5 | 10"Ø | PVC | 2,300 | 2010 | Masacpasac Spring – Nasarang |
| 6 | 8"Ø | PVC | 100 | 2010 | Nasarang – Kulador Treatment Plant |
| 7 | 8"Ø | CI | 1,110 | 1957 | Masacpasac Spring – Nasarang |
| 8 | 6"Ø (150mm) | CI | 90 | 1957 | Nsarang |
| 9 | 6"Ø | CI | 1,200 | 1957 | Nasarang – Kulador Treatment Plant |
| 10 | 10"Ø | PVC | 80 | 2006 | Intake Box – Nasarang |
| 11 | 8"Ø | PVC | 410 | 2010 | Nasarang – Kulador Treatment Plant |
| 12 | 6"Ø | CI | 2,600 | 1957 | Kulador Treatment Plant – San Andres FM |
| 13 | 8"Ø | PVC | 2,600 | 2010 | Kulador Treatment Plant – San Andres FM |
| 14 | 8"Ø | GI | 2,600 | 1990 | Kulador Treatment Plant – San Andres FM |
| TOTAL-1 | | | 19,260 | | |
| Transmission Pipeline (San Andres to Poblacion) | | | | | |
| 15 | 8"Ø | | 2,523 | 2006 | San Andres FM – Rizal Ave. Ext. (Tennis Court) |
| 16 | 8"Ø | PVC | 512 | 2012 | Rizal Ave. Ext. (Tennis Court) – Del Rosario St. |
| 18 | 8"Ø | GI | 300 | 1987 | San Andres FM – San Andres Basketball Court |
| 18 | 8"Ø | PVC | 2,009 | 1987 | San Andres Basketball Court – 6 th St. |
| TOTAL-2 | | | 5,344 | | |
| TOTAL (TRANSMISSION) | | | 24,604 | | |
| Distribution Pipeline (Poblacion Area) | | | | | |
| 19 | 6"Ø | PVC | 696 | 1987 | Purok 5 - Mabini Ave. - 6 th St. - Molave St. |
| 20 | 6"Ø | PVC | 852 | 2018 | Diversion Road (Junction) – Doctor's Hospital |
| 21 | 6"Ø | PVC | 402 | 2019 | Diversion Road (Junction) – Doctor's Hospital |
| 22 | 6"Ø | PVC | 90 | 2006 | 7 th St. (FH) – Brgy. 13 Concrete Reservoir |
| 23 | 6"Ø | PVC | 832 | 2010 | Legaspi Ave. – Executive Heights Subdivision (Entrance) |
| 24 | 4"Ø (100mm) | PVC | 716 | | Purok 5 – Purok 4 – Mabini Ave. |
| 25 | 4"Ø | PVC | 96 | | 6 th St. – 5 th St. |
| 26 | 4"Ø | PVC | 559 | 2008 | Mabini Ave. – 5 th St. – McKinley Ave. – Del Rosario St. |
| 27 | 4"Ø | PVC | 145 | | San Francisco St. – Burgos Ave. |
| 28 | 4"Ø | PVC | 150 | 2019 | Callejon St. (Salug) – Burgos Ave. |
| 29 | 4"Ø | PVC | 196 | | Corner Molave St. – Corner San Francisco St. (Along Mabini Ave.) |
| 30 | 4"Ø | PVC | 502 | 1987 | 7 th St. (Alegro Hotel) – LTO – Rizal Ave. Ext. – San Roque St. (City Hall) |
| 31 | 4"Ø | PVC | 122 | | San Roque St. (City Hall) – San Francisco St. (City Plaza) |
| 32 | 4"Ø | PVC | 144 | 1987 | Corner San Francisco St. – Corner Del Rosario St. (Along Rizal Ave.) |
| 33 | 4"Ø | PVC | 204 | 2006 | Tennis Court – Samar Provincial Hospital |
| 34 | 4"Ø | PVC | 136 | | Samar Provincial Hospital – Himyangan |
| 35 | 4"Ø | PVC | 123 | 2006 | Himyangan – San Roque St. |
| 36 | 4"Ø | PVC | 796 | | Executive Heights Subdivision (Entrance) – Milagros St. (Guinsorongan) |
| 37 | 4"Ø | PVC | 485 | | Sto. Niño St. (Guinsorongan) – Piczonville PS |
| 38 | 4"Ø | PVC | 312 | | Corner Legaspi Ave. – Corner Curry Ave. (Along Del Rosario St.) |

| | | | | | |
|---|------------|-----|---|------|--|
| 39 | 4"Ø | PVC | 188 | 1987 | Corner Curry Ave. – Corner Allen Ave. (Along Del Rosario St.) |
| 40 | 4"Ø | PVC | 449 | 1987 | Corner Allen Ave. – Old Antiao Bridge (Along Del Rosario St.) |
| 41 | 4"Ø | PVC | 3,117 | | Old Antiao Bridge – Brgy. Hall (Maulong) |
| 42 | 4"Ø | PVC | 158 | | V&G PS – V&G Subdivision |
| 43 | 4"Ø | PVC | 6 | | Cogao Pumping Station |
| 44 | 3"Ø (63mm) | PVC | 185 | | Bliss (Entrance) – Bliss Chapel |
| 45 | 3"Ø | PVC | 669 | | Purok 5 (Canlapwas) – Corner McKinley Ave. |
| 46 | 3"Ø | PVC | 83 | | Corner Azucena St. – 5 th St. (Brgy. Hall – Muñoz) |
| 47 | 3"Ø | PVC | 127 | | Corner 7 th St. – Old Public Market (Allen Ave. Ext.) |
| 48 | 3"Ø | PVC | 360 | 2010 | Corner 5 th St. – San Bartolome St. (Along Mabini Ave.) |
| 49 | 3"Ø | PVC | 68 | 1987 | Corner San Bartolome St. – Del Rosario St. (Pieta Park) |
| 50 | 3"Ø | PVC | 153 | 1987 | Corner Mabini Ave. – Corner McKinley Ave. (Along San Francisco St.) |
| 51 | 3"Ø | PVC | 124 | | Corner Mabini Ave. (Tia Anita's) – Corner Allen Ave. (Mang Inasal) (Along San Roque St.) |
| 52 | 3"Ø | PVC | 309 | | Corner Mabini Ave. – Corner Curry Ave. (Along San Francisco St.) |
| 53 | 3"Ø | PVC | 925 | | Corner Curry Ave. – Guindapunan (Along San Roque St.) |
| 54 | 3"Ø | PVC | 184 | 184 | Samar Provincial Hospital – DPWH |
| 55 | 3"Ø | PVC | 372 | 2011 | SSU Guindapunan Campus |
| 56 | 3"Ø | PVC | 325 | | Corner Legaspi Ave. – Corner Curry Ave. (Along San Francisco St.) |
| 57 | 3"Ø | PVC | 309 | 1987 | Corner Curry Ave. – Corner Mabini Ave. (Along San Francisco St.) |
| 58 | 3"Ø | PVC | 474 | | Corner Legaspi Ave. – Corner Curry Ave. (Along San Bartolome St.) |
| 59 | 3"Ø | PVC | 316 | 1987 | Corner Curry Ave. – Corner Mabini Ave. (Along San Bartolome St.) |
| 60 | 3"Ø | PVC | 148 | | Lincoln Ave. |
| 61 | 3"Ø | PVC | 143 | | Taft Ave. |
| 62 | 3"Ø | PVC | 628 | | Corner San Roque St. – CWD (Along Allen Ave.) |
| 63 | 3"Ø | PVC | 622 | 1987 | Pier 2 – Mang Inasal (Along Allen Ave.) |
| 64 | 3"Ø | PVC | 120 | | Callejon St. (Brgy. 4) |
| 65 | 3"Ø | PVC | 94 | | Corner Sta. Cruz St. – Sto. Niño St. (Guinsorongan) |
| 66 | 3"Ø | PVC | 822 | | Corner Milagros St. – Bonoanan E/S |
| 67 | 3"Ø | PVC | 544 | | Camp Lukban Entrance (Gate 1) – DTU Building |
| 68 | 3"Ø | PVC | 651 | | Maulong Brgy. Hall – Dead End (Distribution Line) |
| 69 | 3"Ø | PVC | 253 | | Road Crossing – Sitio Igot |
| 70 | 3"Ø | PVC | 177 | | Allen Ave. – Curry Ave. (Along Pier 1 & Pier 2) |
| 71 | 3"Ø | PVC | 25 | | Allen Ave. – CWD Compound |
| 72 | 3"Ø | PVC | 26 | | CWD Gate – Sulod St. (Allen Ave. Ext.) |
| 73 | 3"Ø | PE | 317 | | Esmeralda St. – McKinley Ave. (Along 5 th St.) |
| TOTAL (TRANSMISSION) | | | 21,028 | | |
| TOTAL (TRANSMISSION/DISTRIBUTION LINE) | | | 45,632- linear meter (45.632-kilometers) | | |

3.1.4 WSC CLASSIFICATION AND TARIFF CHARGES

Customers of CWD are classified into five types, namely, Residential/Government, Commercial/Industrial, Commercial A, Commercial B, Commercial C and Bulk/Wholesale.

The current water rate was implemented last March 2018 with a minimum charge equivalent to 10-cubic meter consumption. Below is the current water rate of Catbalogan Water District (CWD) with a corresponding increase of charges based on the actual consumption, classification and size of water meter used or installed.

| Classification | Size of WM | Minimum Charge | Commodity Charge | | | |
|------------------------|------------|----------------|------------------|-------------|-------------|-------------|
| | | | 10-cu.m. | 11-20 cu.m. | 21-30 cu.m. | 31-40 cu.m. |
| Residential/Government | ½" | ₱ 200.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | ¾" | ₱ 320.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | 1" | ₱ 640.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | 1-1/2" | ₱ 1,600.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | 2" | ₱ 4,000.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | 3" | ₱ 7,200.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| Commercial/Industrial | 4" | ₱14,400.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | ½" | ₱ 400.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| | ¾" | ₱ 640.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| | 1" | ₱ 1,280.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |

| | | | | | | |
|-----------------|--------|------------|---------|---------|---------|---------|
| | 1-1/2" | ₱ 3,200.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| | 2" | ₱ 8,000.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| | 3" | ₱14,400.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| | 4" | ₱28,800.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| Commercial A | 1/2" | ₱ 350.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| | 3/4" | ₱ 560.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| | 1" | ₱ 1,120.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| | 1-1/2" | ₱ 2,800.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| | 2" | ₱ 7,000.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| | 3" | ₱12,600.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| Commercial B | 1/2" | ₱ 300.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| | 3/4" | ₱ 480.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| | 1" | ₱ 960.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| | 1-1/2" | ₱ 2,400.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| | 2" | ₱ 6,000.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| | 3" | ₱10,800.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| Commercial C | 1/2" | ₱ 250.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| | 3/4" | ₱ 480.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| | 1" | ₱ 800.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| | 1-1/2" | ₱ 2,000.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| | 2" | ₱ 5,000.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| | 3" | ₱ 9,000.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| Bulk/Whole Sale | 1/2" | ₱ 600.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 3/4" | ₱ 960.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 1" | ₱ 1,920.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 1-1/2" | ₱ 4,800.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 2" | ₱12,000.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 3" | ₱21,600.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 4" | ₱42,300.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |

3.2 SOURCE OF WATER: CATCHMENT AND EXTRACTION FROM SOURCE

The District currently has four (4) main water sources, namely Kulador (Surface), Caramayon I, Caramayon II, and Masacpasac (Spring), with two supplemental water sources namely; Tumalistis and Executive Deep Wells. There are also two satellite water sources, namely; Payao and Lagundi Deep Wells.

3.2.1 KULADOR TREATMENT FACILITY (Spring)

The plant is located 2.7 kilometers from Barangay San Andres of Catbalogan, Samar. Coordinates of the diversion point is Latitude: 11°48'02"; Longitude: 124°53'53.82".

The treatment plant receives water from the Antiao River through an Intake Box 3m x 3m wide and 2.5m depth. The water was conveyed through a telescopic Transmission Line of 250mm and 200mm diameter PVC pipes and goes into a 4,000cum/day clarifier system for water treatment, with a plan for upgrading to 6,000-7,000CMD.

3.2.2 CARAMAYON I PUMPING STATION (Spring)

The project started on February 22, 2002. Fund by 32M ADB – Loan under LWUA's Small Towns Water Supply System Project (STWSSP). Component of the project are the following:

- Construction of Impounding Dam and Sump Tank
- Pumping facilities 1-100hp, 2-500hp, 440v, 3 diameter
- Generator, 300hp
- Laying of 5.1km 10" diameter Transmission Lines
- Installation of 3-phase Electric Power Line, 13.2 KV primary lines

The Project site is not accessible to any mode of transportation. The spring is located in a highland Barangay of Lobo, Sitio Caramayon, it is approximately 9.1 kms. from the nearest lowland Barangay of San Andres and about 11 kms. from the center of the Poblacion. Caramayon spring could be reached only by foot passing through mountains, the highest elevation of which is 197 meters above mean sea level and traversing the same river about twenty (20) times. The said spring source is below and between mountain ranges with an elevation of 84.7 meters. Coordinates of the diversion point is Latitude: 11°50'30"; Longitude: 124°54'11".

Except for the pumps which were airlifted (courtesy of the 8ID, Camp Lucban & PAF) all materials and equipment were handled/ carried manually.

Caramayon spring source capacity is 140 lps. A Mini impounding Dam was built from where water flows to the sump Tank by gravity. Three high head submersible pumps, 1-100hp, 2-50 hp was installed to pump the water to the break pressure chamber and from there water flows by gravity to the Kulador Treatment Plant via a 10-inch pipeline through a 4.65-km distance.

A 3-phase power line 13.2 KV Primary Line with a distance of 11.9 kms was constructed as a primary prime mover of the pumping equipment. A generator was installed as standby power.

5.1 kms pipelines 10 inch and 8 inch diameter were installed. On February 22, 2005, test run was conducted on the pumping equipment and three days after it was put to operation.

With the three (3) pumps capable of delivering a combined capacity of 91 lps, it can supply 9000 households.

3.2.3 CARAMAYON II PUMPING STATION (Spring)

The project started first quarter of 2018, and was operational December 2019. The diversion point of the project is N11°50'39.5" E124°54'37.4". Component of the project are the following:

- Pumping Facilities: 125hp (Pump & Motor and Variable Frequency Drive), Sump Tank (size: width=3.175m, length=4.175m, height=4.175m) and Pump House
- 3-units Transformer 50KVA
- 8" diameter PVC Transmission Lines

The Project site is located in highland barangay of Lobo and is not accessible to any mode of transportation and approximately 500-linear meters from Caramayon I.

3.2.4 MASACPASAC (Spring)

The coordinates of the diversion point of Masacpasac Spring is 11°49'17" (Latitude) and 124°54'02" (Longitude), and approximately 5 kms from Brgy. San Andres.

The water source contributes an average of 64% of the total water production with two transmission lines, CI 6" and CI 10" with a total rated capacity of 55 lps.

The source is not passable by any vehicle and can only be reached by foot.

3.2.5 TUMALISTIS PUMPING STATION (Deep Well)

This is a deep well water source providing water in the southside part of Catbalogan. This has a total rated capacity of 4.5 lps utilizing a 10hp submersible pump.

Twenty hours operation is intended for the Executive Heights Subdivision on scheduled basis.

3.2.6 EXECUTIVE PUMPING STATION (Deep Well)

This is a deep well water source providing additional water supply to high-elevated area of Executive Heights Subdivision (Phase 2-A and Phase 2-B) operating 3-4 hours per day. This has a total rated capacity of 1.5 lps utilizing a 2hp submersible pump. The diversion point of project is N 11°45'53.4" E 124°53'18.2". The project component includes the following:

- 1-set of 2HP Submersible Pump and Motor
- 1-unit Chlorinator
- 100-lin.m. 2"Ø PE Pipeline
- Deep Well Data (Bore Hole = 8"Ø; Riser Pipe = 2"Ø GI @ 40.50 meter; Well Deep = 51m)
- And currently utilizing the 1-cu.m. Concrete Tank owned by the Subdivision.

3.2.7 V & G BOOSTER PUMP

V & G 5HP Booster Pump was donated by the Developer to CWD to cater the needs of residents of the said subdivision. The station lot is now secured by a concrete fence with cyclone wire to avoid unauthorized entry. Facilities also includes concrete water tank (depth: 180m, width: 4.20m & length: 5.00m).

3.2.8 CANLAPWAS IN-LINE BOOSTER PUMP

This station is equipped with 25hp, 220v, 3 phase, floor mounted high pressure pump. It boosts water pressure to increase the water supply in Canlapwas, San Pablo, Muñoz, Brgy. 1, Brgy. 2, Mercedes and Maulong.

3.2.8 MABINI IN-LINE BOOSTER PUMP

Mabini in-line Booster pump with 40 hp, 220v, 3 phase, high head, submersible pump is boosting water pressure to increase the area coverage supplied due to existing limited size of Distribution Line. It is serving San Pablo, Muñoz, Brgy. 1, Brgy. 2, Brgy. 10, Mercedes and Maulong.

3.2.9 440 CU.M. CONCRETE RESERVOIR

This Reservoir was constructed by the Americans way back 1935. It was rehabilitated and recommissioned last 2006. It is located in an elevated part of Brgy. 13, with an elevation of 35m above sea level. It is used to augment the high demand during peak hours. The remaining 100cu.m. of water was reserved for fire fighting purposes.

3.2.10 COGAO BOOSTER PUMP

This Station was constructed last 2015 to provide water supply to two (2) island Barangays namely Darahuway Dako and Darahuway Guti. Transmission line is a 2" diameter x 1.7km underwater. It is equipped with a floor mounted high pressure, 5hp, 220v, 3-phase, 75m TDH, and 5lps capacity. Partly, this station also boosts water pressure to Brgy. Bunuanan.

3.2.11 ANTIAO BOOSTER PUMP

This Station was constructed late 2018 to boost water supply to far-flung and high elevated areas of barangay Mercedes and Maulong. Distribution Line is 4"Ø PVC pipe with pumping facilities of 20HP Pump & Motor and VFD with control panel.

3.2.12 LAGUNDI PUMPING STATION

This Station (lot) is being utilized thru Contract of Usufruct thru SP Resolution No. 2020-089 by the City Government and the well/project was developed and constructed year 2017 and was operational January of 2018 to supply the water needs of the BJMP. Two (2) units of Automatic "Tubig" Machine (ATM) were installed in the pumping station and at barangay Hall to cater the needs of the residents of the barangay thru a Level I water supply system. The diversion point of the station is N 11°45'43.7" E 124°54'39.2". The project component includes the following:

- 1-set of 2HP Submersible Pump and Motor
- 1-unit Chlorinator
- 600-lin.m. 2"Ø PE Pipeline
- 2-units Stainless Tanks (2 cu.m. & 1-cu.m.)
- Deep Well Data (Bore Hole = 10"Ø; Casing = 8"Ø – 6"Ø PVC Pipe; Riser Pipe = 2"Ø GI Pipe @ 240'; Well Deep = 270')

3.2.13 PAYAO PUMPING STATION

This Station (lot) is being utilized thru Contract of Usufruct by the City Government and the well/project was developed and constructed year 2019 and was operational January of 2020 to supply the water needs of the Local Government Facilities (Relocation Site, COVID Facilities and other government offices. This has a total rated capacity of 1.5 lps utilizing a 2HP submersible pump. The diversion point of the station is N 11°48'8.1" E 124°52'2.2". The project component includes the following:

- 1-set of 2HP Submersible Pump and Motor
- 1-unit Chlorinator
- 3-meters 2"Ø GI Supply Pipe
- 2-units Stainless Tanks (2-cu.m.) owned by the City LGU
- Deep Well Data (Bore Hole = 8"Ø; Casing = 8"ØGI (Not fully cased); Riser Pipe = 1-1/2"Ø GI Pipe @ 22.50 meter; Well Deep = 31 meter)

3.3 FLOW DIAGRAM

To accurately define the hazards in the water supply system, it is best to describe first the components of the system in detail. The diagram shows the flow of water from the source, to the treatment, and to distribution. In between are operational and inspection processes to ensure the quality of water

Figure 1.0: System Schematic Diagram

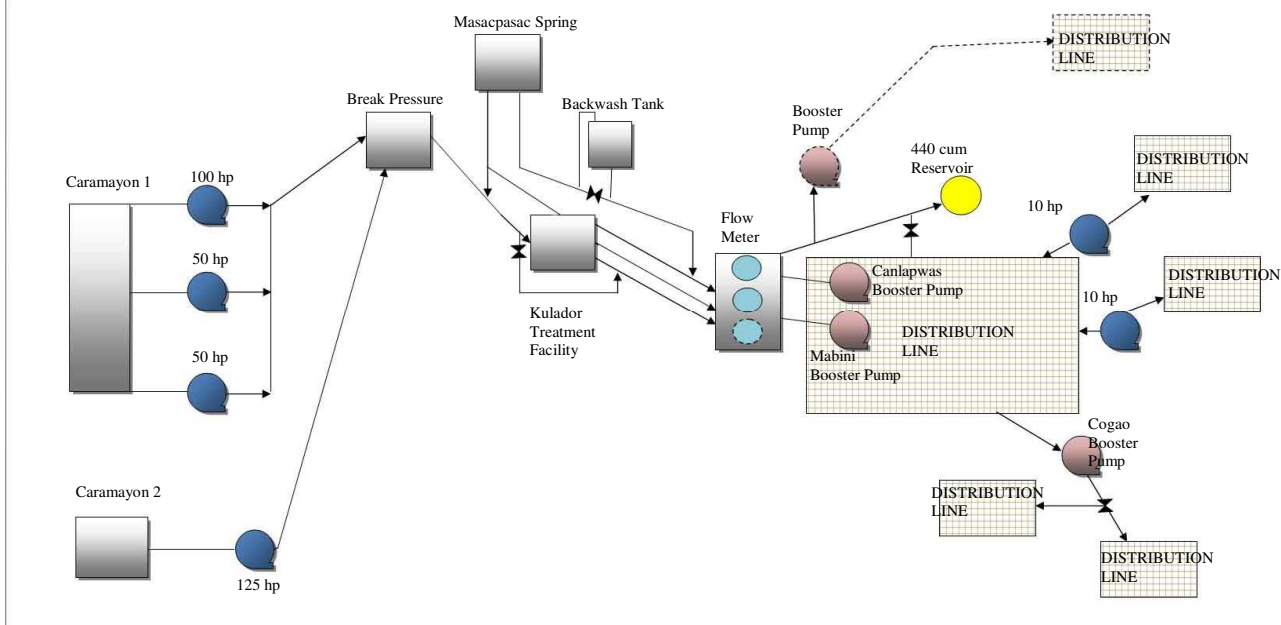
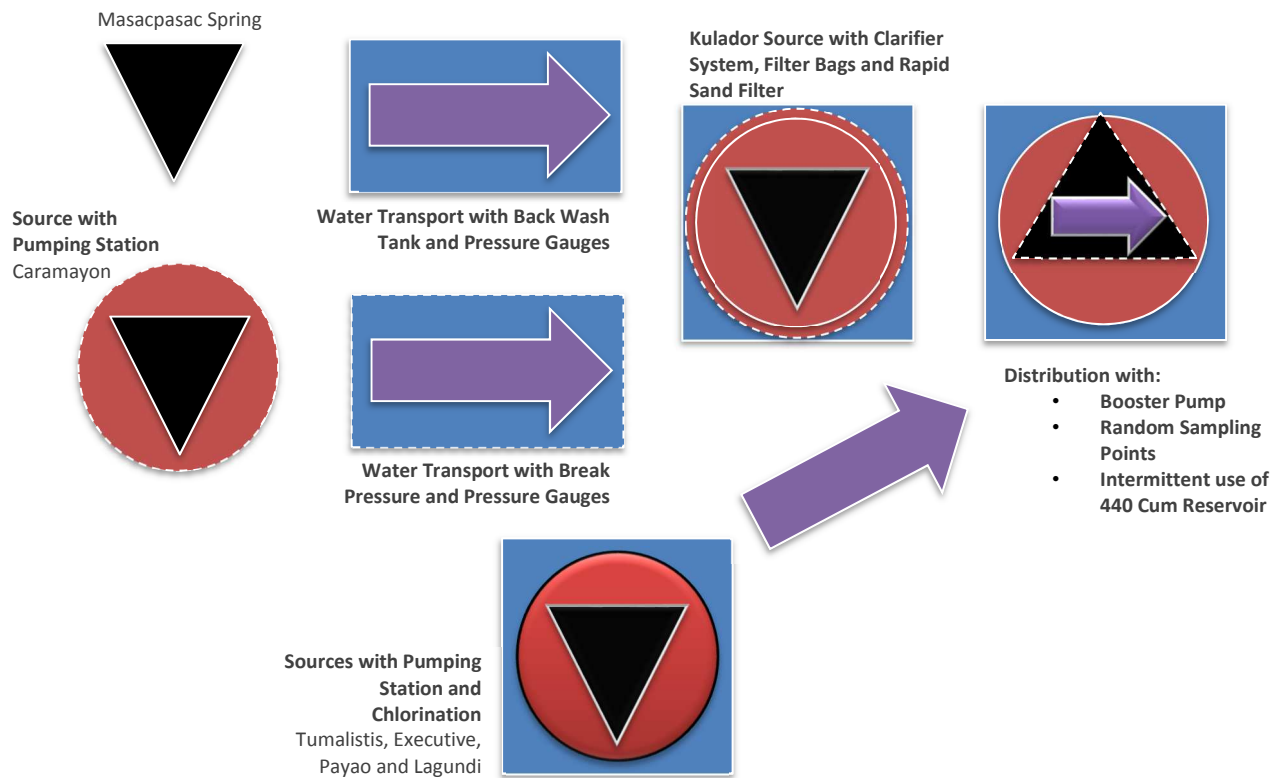
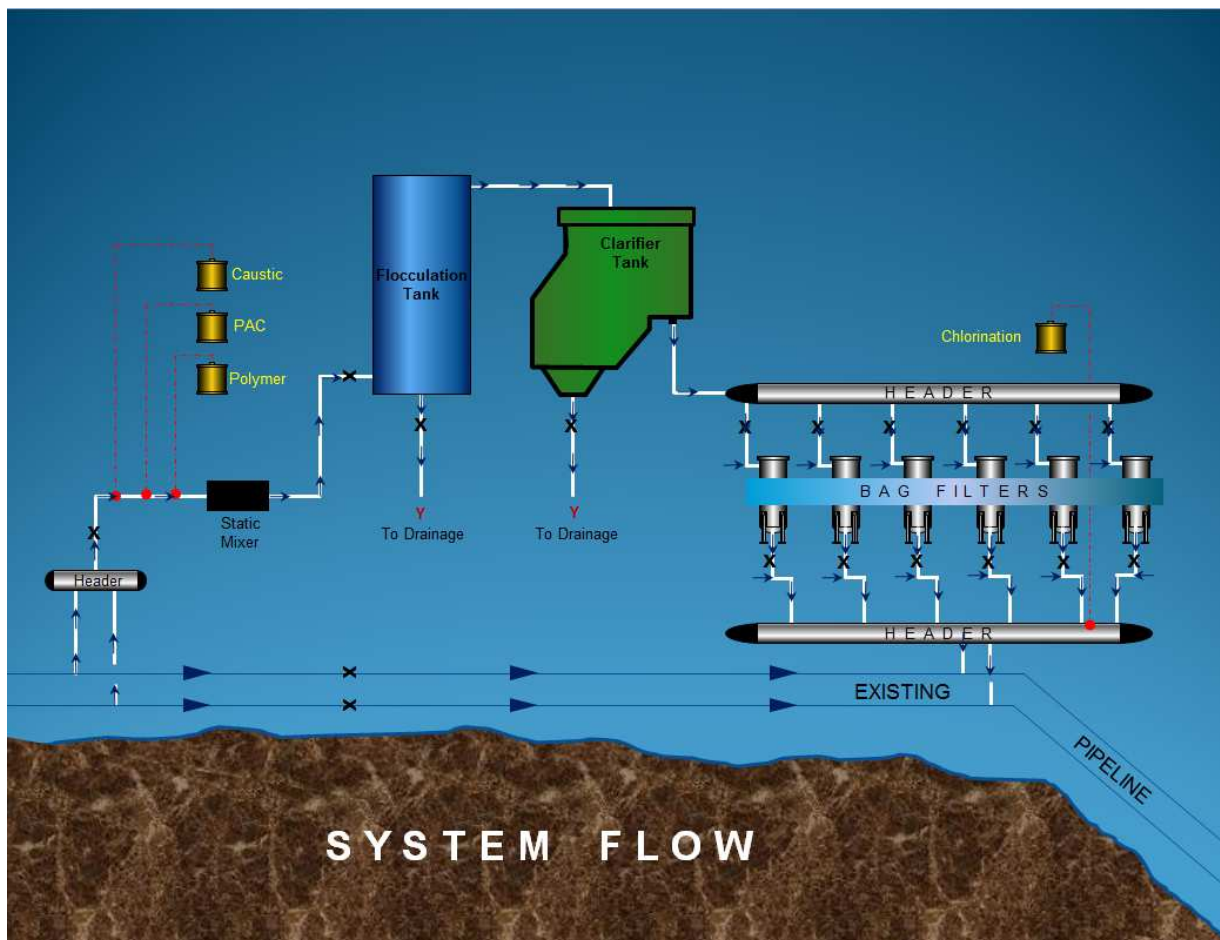


Figure 2.0: Process Flow Diagram



3.4 TREATMENT PROCESSES

Figure 4.0 Clarifier System Flow



The treatment facility is located in Kulador, approximately 2.7 kms from the poblacion as discussed in item 3.2.1.

The facility is equipped with a clarifier system which can process 4,000 CMD of turbid water. Turbid water that enters the system is injected with Chlorine (Pre), PAC and Polymer to capture sediments, it will then go to a fluctuation tank and clarifier to let the sediments settle down. Finished product will pass through bag filters for final process of filtration before chlorine (Post) is injected for disinfection.

3.5 DISTRIBUTION SYSTEM

Figure 3.0 Distribution Line

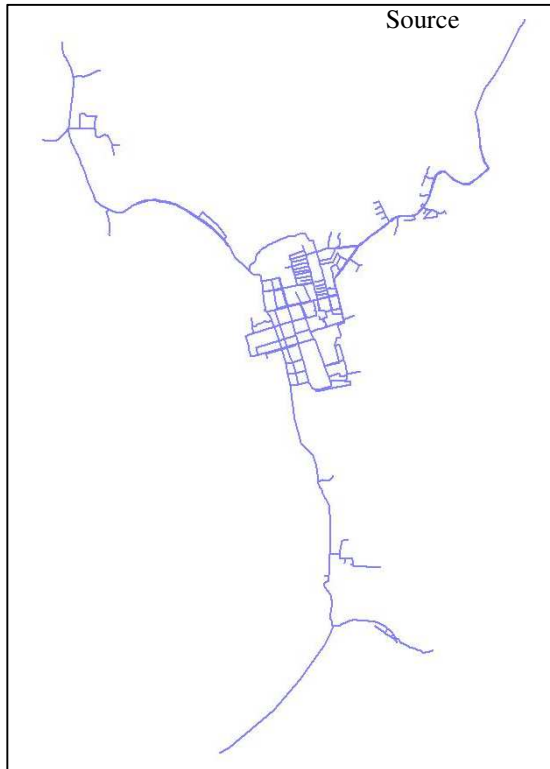
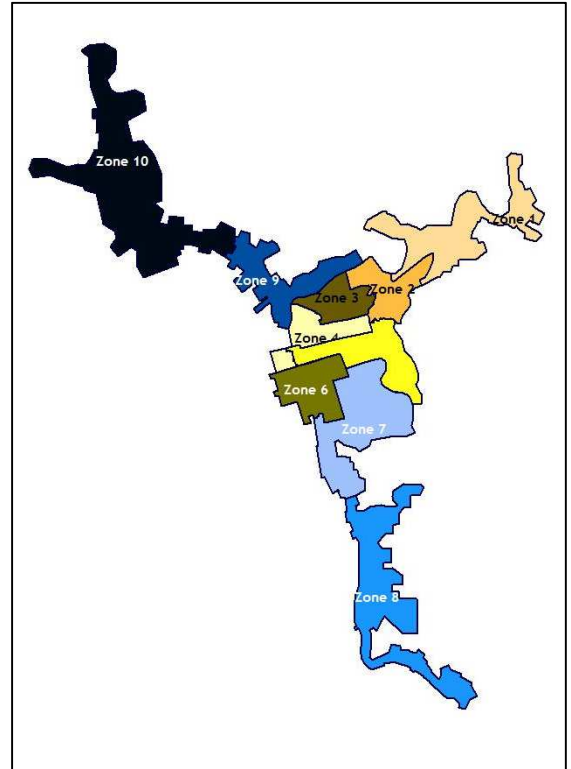


Figure 4.0 Zoning



The current distribution line is serving 26 barangays subdivided into 10 zones. Three (3) booster pumps (Canlapwas, Mabini & Old Antiao) are in placed within the poblacion to boost water pressure to far flung barangays/areas, and one booster pump at V&G to boost water pressure to the residents of the subdivision. Another booster pump was place in Cogao to boost water pressure to Brgy. Bunuanan and to supply the two island barangays of Darahuway Dako and Darahuway Guti with Level I water system.

As shown in figures 3 and 4, northern tip of zone 10 and southern tip of zone 8 covers the barangays that are farthest from the source. In addition, these barangays experience low to zero water pressure especially during peak hours.

The district distribution lines and facilities information are database in the existing Geographic Information System of the office.

In the later part of this plan, control measures and improvement plans will be discussed to answer the different hazards that the current distribution lines is having.

3.6 WATER QUALITY REQUIREMENTS

The district follows the standards set by the Administrative Order No 2007- Philippine National Standards for Drinking Water of 2007.

To ensure safe drinking water, the laboratory technician conducts the following:

1. Bacteriological Test

a. PHC Bottle

Tests are conducted every Monday and Wednesday using PHC bottle. Daily results are saved in a database where reports are generated and submitted to the City Health Office.

b. Microbiological (Bacteriological) Test

The test is conducted by a DOH accredited testing center in the region. Currently, Region VIII has two (2) accredited testing centers, the Eastern Visayas Regional Medical Center (EVRMC) and Primewater-Leyte Metro Water District. Various water samples are submitted to the accredited laboratory center every month for testing, and subsequently submitted to LWUA. Hereunder is the required minimum number of samples and its frequency.

| Population Served | Minimum Frequency of Sampling for Total Coliform and Thermotolerant Coliform/E.Coli | Minimum Frequency of Sampling for Heterotrophic Plate Count | Point of Compliance |
|--|---|---|---------------------|
| Less than 5,000 | 2 samples monthly | 2 samples monthly | Consumer's Tap |
| 5,000 – 100,000 | 1 sample per 5,000 population plus 2 additional samples monthly | 1 sample per 5,000 population plus 2 additional samples monthly | Consumer's Tap |
| More than 100,000 | 1 sample per 10,000 population plus 12 additional samples monthly | Required at least 40% of the sampling points | Consumer's Tap |
| Note: Collection of samples should be spread out within a month | | | |

2. Laboratory Test

Water sampling is conducted daily in random household points within the service area. The office is equipped with laboratory equipment/test kits to measure the following laboratory parameters:

- a. Chlorine Residual - 0.3 – 1.5 ppm (mg/L)
- b. Salinity - 500 ppm/s
- c. Conductivity - No Limit
- d. Ph - 6.5 - 8.5 mg/L
- e. Total Dissolved Solid - 600 mg/L
- f. Turbidity - 5.0 NTU

Laboratory test results are encoded to a database where reports are generated for submission to the City Health office, and LWUA as additional attachments

3. Physical-Chemical Test

This test is conducted once a year by a DOH accredited laboratory testing center. The table below shows the parameters being measured by the test.

| PARAMETERS | PNSDW Maximum Allowable Level | Sampling Location |
|----------------------------------|-------------------------------|--|
| I. Mandatory Parameters | | |
| 1.) Arsenic | 0.01 mg/L | Treatment Plant Outlet/Source |
| 2.) Cadmium | 0.003 mg/L | Customer's Tap |
| 3.) Lead | 0.01 mg/L | Customer's Tap |
| 4.) Nitrate | 50 mg/L | Treatment Plant Outlet/Source |
| 5.) Color – Apparent | 10 CU | Treatment Plant Outlet/Source/Customer's Tap |
| 6.) Turbidity | 5 NTU | Customer's Tap |
| 7.) Ph | 6.5 to 8.5 | Treatment Plant Outlet/Source/Customer's Tap |
| 8.) Total Dissolved Solids (TDS) | 600 mg/L | Treatment Plant Outlet/Source |
| 9.) Disinfection Residual | | |
| 9-1) Residual Chlorine | 0.30 to 1.5 mg/L | Treatment Plant Outlet/Source/Customer's Tap |
| 9-2) Chlorine Dioxide | 0.20 to 0.40 mg/L | Treatment Plant Outlet/Source/Customer's Tap |
| II. Additional Parameters | | |
| (Determined by LDWQMC) | | |

3.7 DELIVERY POINT, INTENDED USERS OF WATER AND INTENDED USES OF THE WATER

Catbalogan Water District is currently serving 9,229 customers within the City of Catbalogan. The farthest delivery point to the North is barangay Maulong, estimated to be 3-kms from Poblacion, while farthest to the Southern delivery point is barangay Bunuanan, about 2-kms away from the Poblacion.

Intended users of water are the population of the City of Catbalogan. Currently 26 barangays were being served, 22 of which have Level III and the remaining 4 have Level I water supply systems.

3.8 CURRENT DELIVERED-WATER QUALITY

The current delivered water generally passed the National Standards for Drinking water, in fact all regular laboratory test results are within the permissible limits in all parameters of the tests.

3.9 PERSISTENT PROBLEMS

The water produced from the sources has different quality issues that were addressed during the treatment process. Here are some of the major problems with some of the sources:

- High Turbidity issues are common in our two sources, Caramayon and Kulador sources during heavy rains,
- High iron Content is a problem in Tumalistis Pumping Station.
- The major problem is not on the quality but on the quantity of water delivered. Although lack of supply doesn't directly affects quality of water, its after effects caused hazard to the supply system, like:
 - o contaminants tends to enter in leak pipes in areas with low/negative pressure
 - o Back flow from customer tanks in areas with low/negative pressure
 - o Areas with no water supply tend to use alternative water sources which are untreated causing water borne diseases.

The current issues/problems will be discussed in the later part of this plan. These were identified as hazards and were addressed through control measures.

4. RISK ASSESSMENTS, HAZARD TABLE AND EXISTING CONTROL MEASURES

4.1 RISK ASSESSMENT METHODOLOGY

The team uses the hazard/risk table methodology. With this method, the team identified the different hazards from water sources, to treatment plants, to pumping stations, distribution lines and other facilities where the quality of water may be affected.

In this Methodology, the hazard table was clustered into groups for easy categorization. These grouping are Source, Treatment, Distribution, and Customer premises.

The table allocates a column for Raw Risk, Existing Control Measure being applied to minimize the event, and the residual risks which determine if there are still risks that remains after the existing control measure.

4.2 HAZARD/RISK TABLE AND EXISTING CONTROLS

The Hazard / Risk table is subdivided into different areas of focus like, Water Source, Treatment, Distribution, and customer taps.

| Risk Ref | Priority | Hazard | Hazardous Event (Source of Hazard) | Raw Risk | | | Existing Control Measure | Effectiveness of Existing Control Measures | Residual Risk | |
|---------------------------------|----------|--------|--|------------|----------|-------|---|--|------------------|-------|
| | | | | Likelihood | Severity | Score | | | Likelihood | Score |
| S. WATER SOURCES | | | | | | | | | | |
| S.1 CARAMAYON I (SPRING) | | | | | | | | | | |
| S1.1 | L | M | Seepage of animal and human wastes in existing sink holes near the source | 5 | 5 | 25 | Uncontrollable in the catchment, but measures are in the treatment facility | Bacteriological Test Results shows that the water produced "Passed" the Multiple Tube Fermentation Technique and Pour Plate Method | 3 | 15 |
| S1.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination sabotage (poisoning) and vandalism of station's equipment | 5 | 4 | 20 | Watchman is on-Duty 24/7 at the Pumping Station | Watchman cannot fully monitor the entire area to prevent entry of unauthorized persons | 5 | 20 |
| S1.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timber Poaching activities | 4 | 3 | 12 | Tree planting activities is conducted every Environment Day and | Problems on turbidity still existent especially during rainy season | 4 | 12 |

| | | | | | | | | | | |
|--------------------------------|---|---|--|---|---|----|--|--|---|----|
| | | | leading to change in the physical quality (high turbidity) of water | | | | CWD Anniversary. Coordination with the City LGU on the implementation of ordinances regarding watershed protections | and calamities | | |
| S1.4 | H | C | Fish poisoning activities near the source resulting to water contamination | 4 | 4 | 16 | Watchman is on-Duty 24/7 at the Pumping Station | Watchman cannot fully monitor the entire area to prevent entry of unauthorized persons | 4 | 16 |
| S1.5 | L | P | Presence of algae formation in sump tank leading to change in the quality of water | 5 | 3 | 15 | Monthly Cleaning of Sump Tank | Reduce the formation of Algae at the Tank | 1 | 3 |
| S1.6 | L | P | Well casing damage due to wear and tear | 5 | 3 | 15 | Regular monitoring conducted by the Watchman/Operator | Well casing properly maintained | 4 | 12 |
| S.2 MASACPASAC (SPRING) | | | | | | | | | | |
| S2.1 | L | M | Seepage of animal and human wastes in existing sink holes near the source | 5 | 5 | 25 | Uncontrollable in the catchment, but measures are in the treatment facility | Bacteriological Test Results shows that the water produced "Passed" the Multiple Tube Fermentation Technique and Pour Plate Method | 3 | 15 |
| S2.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination sabotage (poisoning) and vandalism of catchment | 5 | 4 | 20 | Watchman is on-Duty 24/7 at the Pumping Station | Watchman cannot fully monitor the entire area to prevent entry of unauthorized persons | 5 | 20 |
| S2.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timber Poaching activities leading to change in the physical quality (high turbidity) of water | 4 | 3 | 12 | Tree planting activities is conducted every Environment Day and CWD Anniversary. Coordination with the City LGU on the implementation of ordinances regarding watershed protections | Problems on turbidity still existent especially during rainy season and calamities | 4 | 12 |

| | | | | | | | | | | |
|------------------------------------|---|---|---|---|---|----|--|---|---|----|
| S2.4 | L | P | Presence of algae formation in sump tank leading to change in the quality of water | 5 | 3 | 15 | Monthly Cleaning of Sump Tank | Reduce the formation of Algae at the Tank | 1 | 5 |
| S2.5 | L | M | Entry of small animals and insects in the uncovered Intake Box | 5 | 5 | 25 | Installation of Aluminium Insect Screen | Installed screen small enough for debris, birds, crawling animals and insects prevented them to enter unto the intake box | 1 | 5 |
| S.3 KULADOR (SURFACE WATER) | | | | | | | | | | |
| S3.1 | L | M | Seepage of animal and human wastes in existing sink holes near the source | 5 | 5 | 25 | Uncontrollable in the catchment, but measures are in the treatment facility | Bacteriological Test Results shows that the water produced "Passed" the Multiple Tube Fermentation Technique and Pour Plate Method | 3 | 15 |
| S3.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination sabotage (poisoning) and vandalism of station's facilities | 5 | 4 | 20 | Watchman is on-Duty 24/7 at the Pumping Station | Watchman cannot fully monitor the entire area to prevent entry of unauthorized persons | 5 | 20 |
| S3.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timber Poaching activities leading to change in the physical quality (high turbidity) of water | 4 | 3 | 12 | Tree planting activities is conducted every Environment Day and CWD Anniversary. Coordination with the City LGU on the implementation of ordinances regarding watershed protections | Problems on turbidity still existent especially during rainy season and calamities. Current Clarifier System can only process 4000-CMD, once upgraded it can process 6000-7000 CMD | 3 | 9 |
| S.4 TUMALISTIS (DEEP WELL) | | | | | | | | | | |
| S4.1 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination | 5 | 4 | 20 | Watchman is on-Duty 24/7 at the Pumping Station Constructed Perimeter Fence | The perimeter prevented entry of unauthorized persons | 1 | 4 |

| | | | | | | | | | | |
|----------------------------------|---|---|--|---|---|----|--|--|---|----|
| | | | sabotage (poisoning) and vandalism of station's equipment | | | | | | | |
| S4.2 | H | M | Existence of Septic Tanks within the 25-meter radius from the Well leading to water contamination | 5 | 5 | 25 | Coordination with City Engineering Office & City Health Office for the proper and correct design/construction of septic tanks (City Ordinance) | The Joint inspection of City Engineering during the construction prevented the bottom-less septic tanks that causes contamination | 4 | 20 |
| S4.3 | L | P | Presence of naturally occurring iron bacteria affecting water quality | 5 | 3 | 15 | Periodic maintenance of riser pipe Post Chlorination | Iron Bacteria still existent in the Well, though there were no complaints received regarding the quality of water supplied | 4 | 12 |
| S.5 CARAMAYON II (SPRING) | | | | | | | | | | |
| S5.1 | L | M | Seepage of animal and human wastes in existing sink holes near the source | 5 | 5 | 25 | Uncontrollable in the catchment, but measures are in the treatment facility | Bacteriological Test Results shows that the water produced "Passed" the Multiple Tube Fermentation Technique and Pour Plate Method | 3 | 15 |
| S5.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination sabotage (poisoning) and vandalism of station's equipment | 5 | 4 | 20 | Watchman is on-Duty 24/7 at the Pumping Station | Watchman cannot fully monitor the entire area to prevent entry of unauthorized persons | 5 | 20 |
| S5.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timber Poaching activities leading to change in the physical quality (high turbidity) of water | 4 | 3 | 12 | Tree planting activities is conducted every Environment Day and CWD Anniversary. Coordination with the City LGU on the implementation of ordinances regarding watershed protections | Problems on turbidity still existent especially during rainy season and calamities | 4 | 12 |
| S5.4 | H | C | Fish poisoning activities near the | 4 | 4 | 16 | Watchman is on-Duty 24/7 at the Pumping | Watchman cannot fully monitor the entire | 4 | 16 |

| | | | | | | | | | | |
|----------------------------------|---|---|--|---|---|----|--|---|---|----|
| | | | source resulting to water contamination | | | | Station | area to prevent entry of unauthorized persons | | |
| S5-5 | L | P | Presence of algae formation in sump tank leading to change in the quality of water | 5 | 3 | 15 | Monthly Cleaning of Sump Tank | Reduce the formation of Algae at the Tank | 3 | 9 |
| S.6 EXECUTIVE (DEEP WELL) | | | | | | | | | | |
| S6.1 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination sabotage (poisoning) and vandalism of station's equipment | 5 | 4 | 20 | Watchman is on-Duty 24/7 at the Pumping Station | Watchman can fully monitor the entire area and prevented the entry of unauthorized persons | 3 | 12 |
| S6.2 | H | M | Existence of Septic Tanks within the 25-meter radius from the Well leading to water contamination | 5 | 5 | 25 | Coordination with City Engineering Office & City Health Office for the proper and correct design/construction of septic tanks (City Ordinance) | The Joint inspection of City Engineering during the construction prevented the bottom-less septic tanks that causes contamination | 4 | 20 |
| S.7 LAGUNDI (DEEP WELL) | | | | | | | | | | |
| S7.1 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination sabotage (poisoning) and vandalism of station's equipment | 5 | 4 | 20 | Watchman is on-Duty 24/7 at the Pumping Station | Watchman can fully monitor the entire area and prevented entry of unauthorized persons | 2 | 8 |
| S7.2 | H | M | Existence of Memorial Park within the 25-meter radius from the Well leading to water contamination | 5 | 5 | 25 | Holy Cross Memorial Center coordinated with City Health Office for the issuance of permit/certification | The Holy Cross Memorial Center is compliant with all the necessary requirements, thus given the permit for its operation | 3 | 15 |
| S.8 PAYAO (DEEP WELL) | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|--|---|---|----|--|---|---|----|
| S8.1 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination sabotage (poisoning) and vandalism of station's equipment | 5 | 4 | 20 | Watchman is on-Duty 24/7 at the Pumping Station | Watchman can fully monitor the entire area and prevented the entry of unauthorized persons | 3 | 12 |
| S8.2 | H | M | Existence of Septic Tanks within the 25-meter radius from the Well leading to water contamination | 5 | 5 | 25 | Coordination with City Engineering Office & City Health Office for the proper and correct design/construction of septic tanks (City Ordinance) | The Joint inspection of City Engineering during the construction prevented the bottom-less septic tanks that causes contamination | 4 | 20 |
| T. WATER TREATMENT | | | | | | | | | | |
| T.1 MAINTENANCE OF CLARIFIER SYSTEM | | | | | | | | | | |
| T1.1 | L | P | High Turbidity due to insufficient filtration capacity (only 50% of the total production) | 4 | 3 | 12 | Installation of additional Filter Bags | Insufficient filtration capacity during high turbidity leads to lower supply of potable water, and low to zero pressure to far-flung and high elevated area | 4 | 12 |
| T1.2 | L | P | Damage of Clarifier System due to wear and tear | 2 | 3 | 6 | Preventive maintenance of parts | Increase life span of Clarifier System | 1 | 3 |
| T.2 APPLICATION OF CHEMICALS | | | | | | | | | | |
| T2.1.1 | L | P | Proper dosing of Poly-Aluminum Chloride (PAC), Polymer and Chlorine | 2 | 3 | 6 | Training and Personnel-in-Charge (Operator) | Proper dosing of Chemicals within its acceptable limits | 1 | 3 |
| T.3 DISINFECTION OF FINISHED PRODUCT | | | | | | | | | | |
| T3.1 | M | M | Proliferation of Pathogens caused by under dosing of Chlorine and clogged or defective Chlorinator | 3 | 5 | 15 | Daily Monitoring | Daily Chlorine Residual Monitoring within its Permissible Limit | 2 | 10 |

| | | | | | | | | | | |
|---|---|---|---|---|---|----|---|--|---|----|
| T3.2 | L | C | Residual Chlorine greater than the maximum limit (1.5ppm) | 2 | 4 | 8 | Daily Monitoring | Daily Chlorine Residual Monitoring within its Permissible Limit | 1 | 4 |
| T3.3 | L | M | Failure of Chlorination due to power interruption | 3 | 5 | 15 | Using the alternative or stand-by Drip-Type Chlorinator | Daily Chlorine Residual Monitoring within its Permissible Limit | 1 | 5 |
| T3.4 | L | M | Failure of Chlorination due unavailability of Chlorine Products due to fortuitous event | 2 | 5 | 10 | Proper monitoring of stock re-order level | Chlorine stocks always above the re-order level | 1 | 5 |
| T3.5 | L | M | Failure of final filtration due to clogged filter bags | 3 | 5 | 15 | Regular schedule of cleaning/monitoring and provision of spare filter bags | Successful final filtration | 1 | 5 |
| T.4 QUALITY CONTROL OF TREATMENT CHEMICALS | | | | | | | | | | |
| T4.1 | L | M | Low quality of treatment chemicals due to lack of quality check during delivery | 2 | 5 | 10 | Follow Standard Operational Procedure during inspection and acceptance of inventories, including the checking of necessary documents/certification (Materials Safety Data Sheets; Report of Analysis for the Percentage of Chlorine Content; and PIPAC) | All delivered inventories/Chemicals undergoes quality check | 1 | 5 |
| T4.2 | H | M | Reduced quality of treatment chemicals due to lack proper storage leading to exposure to rain, humidity, etc. | 5 | 5 | 25 | Construction of Storage Room | Non-exposure to rain and humidity increases the life span and efficacy of the treatment chemicals | 3 | 15 |
| D. DISTRIBUTION | | | | | | | | | | |
| D.1 BURST AND LEAKS | | | | | | | | | | |
| D1.1 | H | M | Ingress of contamination during leak repair near drainage canals | 5 | 5 | 25 | Relocation of existing pipeline along drainage canal | 60% of pipelines along drainage canals have been transferred thus decreases the possibility of water contamination | 3 | 15 |
| D1.2 | H | M | Low workmanship | 4 | 3 | 12 | Skills training | Improved | 3 | 9 |

| | | | | | | | | | | |
|--|---|---|--|---|---|----|---|---|---|----|
| | | | and unhygienic practices in leak repair | | | | Supervision and Monitoring | workmanship and hygienic practices during repair works | | |
| D1.3 | H | M | Entry of contaminants due to leaks caused by vandalism or infrastructure projects of other Government Agencies (DPWH, PEO, CEO) and other private entities | 3 | 5 | 15 | Coordination of concerned agencies and private entities before project implementation and/or immediate advisory in case of damage | Conduct of immediate repair works and avoid possible entry of contaminants | 3 | 15 |
| D1.4 | H | M | Entry of contaminants due to leaks caused by old and dilapidated pipes | 5 | 5 | 25 | On-Going Rehabilitation and Replacement of Dilapidated Pipes | Identified dilapidated pipes were already replaced and rehabilitated, unidentified ageing pipes are yet to be determined for further evaluation | 3 | 15 |
| D.2 WATER DISTRIBUTION PRESSURE | | | | | | | | | | |
| D2.1 | H | M | Entry of contaminants in the Distribution Lines caused by intermittent, low or zero pressure | 5 | 5 | 25 | Conduct Flushing after water interruption | Flushing of hydrants after water interruption reduce/eliminate contaminants and air accumulation along the distribution lines | 2 | 10 |
| D2.2 | H | M | In Maulong experienced low to zero pressure, especially during peak hours | 5 | 5 | 25 | Provide booster pump at Old Antiao Bridge | Pressure along Maulong areas increases during night time provides the consumers the chance for water storage to be use during peak hours | 4 | 20 |
| D2.3 | H | M | Parts of Mercedes (high elevated areas) experienced low to zero pressure, especially during peak hours | 5 | 5 | 25 | Provide booster pump at Old Antiao Bridge | Pressure along Mercedes areas increases during night time provides the consumers the chance for water storage to be use during peak hours | 4 | 20 |
| D2.4 | H | M | Elevated areas in Brgy. 13 | 5 | 5 | 25 | Provide Booster Pump (Diversion Road) | Pumping Station is not yet operational due to | 5 | 25 |

| | | | | | | | | | | |
|------|---|---|--|---|---|----|---|---|---|----|
| | | | experienced low to zero pressure, especially during peak hours | | | | | lot ownership problem (on-process) | | |
| D2.5 | H | M | Bunuanan area experienced low to zero pressure, especially during peak hours | 5 | 5 | 25 | Provide Booster Pump (Cogao) | Pressure along Bunuanan areas increases during night time provides the consumers the chance for water storage to be use during peak hours | 4 | 20 |
| D2.6 | L | M | Back flow from customer's unmaintained elevated (over-head) tanks especially during low or zero pressure | 3 | 5 | 15 | Old or previous Water Meters installed have Non-Return Valve attachments (Note: Identification of Consumers with over-head tanks) | Non-Return Valve avoid back flow | 3 | 15 |
| D2.7 | H | M | Back flow from consumer's alternative and untreated water source | 5 | 5 | 25 | Old or previous Water Meters installed have Non-Return Valve attachments (Note: Identification of Consumers with alternative and untreated water source) | Non-Return Valve avoid back flow | 5 | 25 |

D.3 QUALITY CONTROL OF MATERIALS FOR LEAK REPAIR AND INSTALLATION

| | | | | | | | | | | |
|------|---|---|--|---|---|----|--|--|---|----|
| D3.1 | H | M | Entry of small animals and insects in Pipes stored at the stockyard | 5 | 3 | 15 | Regular inspection of pipes at stockyard | Reduce the risk of entry of all animals and insects to enter into the stored pipes | 4 | 12 |
| D3.2 | H | C | Use of non-food grade materials during installation, repair and rehabilitation | 3 | 3 | 9 | Use of standard and food-grade pipes and fitting materials Inspection of After-the Meter pipeline | Avoid the usage of non-food grade materials that may contaminant the water supply | 1 | 3 |
| D3.3 | L | M | Low quality of materials due to improper inspection during delivery and acceptance | 4 | 5 | 20 | Follow Standard Operational Procedure during inspection and acceptance of inventories, including the checking of necessary documents/certification | All delivered inventories/materials undergoes quality check | 1 | 5 |

D.4 MAINTENANCE OF DISTRIBUTION AND APPURTENANCES

| | | | | | | | | | | |
|--|---|---|---|---|---|----|--|--|---|----|
| D4.1 | L | M | Accumulation of suspended materials in dead-ends | 5 | 5 | 25 | Interconnection of pipelines Periodic Flushing of Hydrants | Interconnection avoid the accumulation of suspended materials Flushing eliminate suspended materials | 1 | 5 |
| D4.2 | H | M | Entry of garbage and other contaminants in open hydrants and blow-off valves | 5 | 5 | 25 | Provide temporary plastic cover | Reduce the risk of entry of garbage and other contaminants | 4 | 20 |
| D4.3 | H | M | Cross-connection with dilapidated and abandoned water pipes | 5 | 5 | 25 | Conduct Investigation and Leak Detection | Determined service connection illegally connected/tapped in abandoned pipelines for immediate disconnection | 3 | 15 |
| D4.4 | H | M | Pipes and Meter Stands submerged or traversed along drainage canal | 5 | 5 | 25 | Relocation of Pipes along drainage canal | On-going relocation of pipes reduces the risk of contamination | 3 | 15 |
| D.5 DISINFECTION OF SERVICE LINES | | | | | | | | | | |
| D5.1 | L | M | Drop of Chlorine Residual (less than the minimum limit of 0.30ppm) not detected | 5 | 5 | 25 | Daily Monitoring of Chlorine Residual Weekly conduct of Bacteriological Test (twice a week) | Daily results shows Chlorine Residual is within the permissible limit (.030 to 1.50ppm) Bacteriological Test Results shows the absence of e.Coli Bacteria in the water supply | 1 | 5 |

4.3 PROPOSED CONTROL MEASURES

| Risk Ref | Priority | Hazard | Hazardous Event (Source of Hazard) | Residual Risk | | Proposed Control Measure | Validation |
|---------------------------------|----------|--------|---|---------------|-------|--------------------------|--|
| | | | | Likelihood | Score | | |
| S. WATER SOURCES | | | | | | | |
| S.1 CARAMAYON I (SPRING) | | | | | | | |
| S1.1 | L | M | Seepage of animal and human wastes in the existing sink holes near the source | 3 | 15 | Soil Erosion Management | Instituting Soil Erosion Management will lessen entry of contaminants in |

| | | | | | | | |
|------------------------------------|---|---|--|---|----|--|---|
| | | | | | | | sink holes |
| S1.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping station which could lead to contamination, sabotage (poisoning) and vandalism of pumping station's equipment | 5 | 20 | Construction of Perimeter Fence | Fencing the perimeter of the station will avoid the entry of wildlife animals and authorized persons |
| S1.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timer Poaching activities which could lead to changes in the physical quality (High Turbidity) of water | 4 | 12 | Strict implementation of existing Ordinances, Laws, Rules and Regulations regarding preservation of watershed/protected area | The strict implementation will reduce the illegal activities that damage the watershed/protected area or causes degradation of the forest cover |
| S1.4 | H | C | Fish poisoning activities near the source resulting to water contamination | 4 | 16 | Strict implementation of existing Ordinances, Laws, Rules and Regulations regarding preservation of water sources | The strict implementation will reduce the illegal activities that causes water contamination |
| S1.6 | L | P | Well Casing damage due to wear and tear | 4 | 12 | Provide Spare unit | Providing spare unit of Well Casing will reduce the occurrence of interruption in water supply |
| S.2 MASACPASAC (SPRING) | | | | | | | |
| S2.1 | L | M | Seepage of animal and human wastes in the existing sink holes near the source | 3 | 15 | Soil Erosion Management | Instituting Soil Erosion Management will lessen entry of contaminants in sink holes |
| S2.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping station which could lead to contamination, sabotage (poisoning) and vandalism of catchment | 5 | 20 | Construction of Perimeter Fence | Fencing the perimeter of will avoid the entry of wildlife animals and authorized persons in the area |
| S2.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timer Poaching activities which could lead to changes in the physical quality (High Turbidity) of water | 4 | 12 | Strict implementation of existing Ordinances, Laws, Rules and Regulations regarding preservation of watershed/protected area | The strict implementation will reduce the illegal activities that damage the watershed/protected area or causes degradation of the forest cover |
| S.3 KULADOR (SURFACE WATER) | | | | | | | |

| | | | | | | | |
|-----------------------------------|---|---|--|---|----|--|---|
| S3.1 | L | M | Seepage of animal and human wastes in the existing sink holes near the source | 3 | 15 | Soil Erosion Management | Instituting Soil Erosion Management will lessen entry of contaminants in sink holes |
| S3.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping station which could lead to contamination, sabotage (poisoning) and vandalism of station's facilities | 5 | 20 | Construction of Perimeter Fence | Fencing the perimeter of will avoid the entry of wildlife animals and authorized persons in the area |
| S3.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timer Poaching activities which could lead to changes in the physical quality (High Turbidity) of water | 3 | 9 | Strict implementation of existing Ordinances, Laws, Rules and Regulations regarding preservation of watershed/protected area | The strict implementation will reduce the illegal activities that damage the watershed/protected area or causes degradation of the forest cover |
| S.4 TUMALISTIS (DEEP WELL) | | | | | | | |
| S4.2 | H | M | Existence of Septic Tanks within the 25-meter radius from the Well leading to water contamination | 4 | 20 | Strict implementation for the proper, correct and standard design/ construction of septic tanks (City Ordinance) | Septic Tanks specifically those near water sources shall be build according to standard specifications to avoid contamination |
| S4.3 | L | P | Presence of naturally occurring Iron Bacteria affecting water quality | 4 | 12 | Research and Purchase a Gadget to control the occurrence of Iron Bacteria at the Well | Installation of this high-end gadget will reduce the occurrence of iron bacteria at the Well |
| S.5 CARAMAYON II (SPRING) | | | | | | | |
| S5.1 | L | M | Seepage of animal and human wastes in existing sink holes near the source | 3 | 15 | Soil Erosion Management | Instituting Soil Erosion Management will lessen entry of contaminants in sink holes |
| S5.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping station which could lead to contamination, sabotage (poisoning) and vandalism of pumping station's equipment | 5 | 20 | Construction of Perimeter Fence | Fencing the perimeter of the station will avoid the entry of wildlife animals and authorized persons |
| S5.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timer Poaching activities which could lead to changes in the physical quality (High Turbidity) of water | 4 | 12 | Strict implementation of existing Ordinances, Laws, Rules and Regulations regarding preservation of watershed/protected | The strict implementation will reduce the illegal activities that damage the watershed/protected area or causes degradation of the forest |

| | | | | | | | |
|----------------------------------|---|---|--|---|----|--|---|
| | | | | | | area | cover |
| S5.4 | H | C | Fish poisoning activities near the source resulting to water contamination | 4 | 16 | Strict implementation of existing Ordinances, Laws, Rules and Regulations regarding preservation of water sources | The strict implementation will reduce the illegal activities that causes water contamination |
| S.6 EXECUTIVE (DEEL WELL) | | | | | | | |
| S6.1 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination sabotage (poisoning) and vandalism of station's equipment | 3 | 12 | Construction of Perimeter Fence | Fencing the perimeter of the station will avoid the entry of wildlife animals and authorized persons |
| S6.2 | H | M | Existence of Septic Tanks within the 25-meter radius from the Well leading to water contamination | 3 | 12 | Strict implementation for the proper, correct and standard design/ construction of septic tanks (City Ordinance) | Septic Tanks specifically those near water sources shall be build according to standard specifications to avoid contamination |
| | | | | | | | |
| S.7 LAGUNDI (DEEP WELL) | | | | | | | |
| S7.2 | H | M | Existence of Memorial Park within the 25-meter radius from the Well leading to water contamination | 3 | 15 | Holy Cross Memorial Center coordinated with City Health Office for the issuance of permit/ certification, and is compliant with all the necessary requirements, thus given the permit to operate | Existing memorial has no noted adverse effect on the water source. |
| S.8 PAYAO (DEEP WELL) | | | | | | | |
| S8.1 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination sabotage (poisoning) and vandalism of station's equipment | 3 | 12 | Construction of Perimeter Fence | Fencing the perimeter of the station will avoid the entry of wildlife animals and authorized persons |
| S8.2 | H | M | Existence of Septic Tanks within the 25-meter radius from the Well leading to water contamination | 4 | 20 | Strict implementation for the proper, correct and standard design/ construction of septic tanks (City Ordinance) | Septic Tanks specifically those near water sources shall be build according to standard specifications to avoid contamination |

| T. WATER TREATMENT | | | | | | | |
|--|---|---|--|---|----|--|--|
| T.1 MAINTENANCE OF CLARIFIER SYSTEM | | | | | | | |
| T1.1 | L | P | High Turbidity due to insufficient filtration capacity (only 50% of the total production) | 4 | 12 | Upgrading of Clarifier System | From 4000CMD capacity to 6000-7000CMD Filtration capacity |
| T.3 DISINFECTION OF FINISHED PRODUCTS | | | | | | | |
| T3.1 | M | M | Proliferation of Pathogens caused by under dosing of Chlorine and clogged or defective Chlorinator | 2 | 10 | Purchase of 5-spares units Chlorinator (High Head) | Chlorinator working or operating effectively minimize the propagation of pathogens |
| T.4 QUALITY CONTROL OF TREATMENT CHEMICALS | | | | | | | |
| T4.2 | H | M | Reduced quality of treatment chemicals due to lack proper storage leading to exposure to rain, humidity, etc. | 2 | 10 | Construction of Additional Storage Facility at San Andres | The additional storage facility will maintain the quality of treatment chemicals for a longer period |
| D. DISTRIBUTION | | | | | | | |
| D1.1 BURST AND LEAKS | | | | | | | |
| D1.1 | H | M | Ingress of contamination during leak repair near drainage canals | 3 | 15 | Relocation of all existing pipelines along drainage canals Installation of Control Valves along the Distribution Line | Minimize the risk or possibility of contamination during repair of leakages |
| D1.2 | H | M | Low workmanship and unhygienic practices in leak repair | 3 | 9 | Skills/Competence Training and Refresher courses | Continuous training and refresher courses is necessary for upgrading of skills |
| D1.3 | H | M | Entry of contaminants due to leaks caused by vandalism or infrastructure projects of other Government Agencies (DPWH, PEO, CEO) and other private entities | 3 | 15 | Enter into an agreement with other concerned government agencies that considered to be effluent to the water system | Government agencies must have proper coordination with the Office to minimize the possibilities of damage in the pipeline system during their implementation of road projects. |
| D1.4 | H | M | Entry of contaminants due to leaks caused by old and dilapidated pipes | 3 | 15 | Pipe ageing and status must be determined Continuous Rehabilitation and | Identification of pipe ageing and status to determine which pipeline need to be prioritized for |

| | | | | | | | |
|--|---|---|--|---|----|---|--|
| | | | | | | Replacement of Dilapidated Pipes | the outright rehabilitation or replacement. Continuous rehabilitation and replacement of dilapidated pipeline will minimize leakages and burst that may cause entry of contaminants |
| D.2 WATER DISTRIBUTION PRESSURE | | | | | | | |
| D2.1 | H | M | Entry of contaminants in the Distribution Lines caused by intermittent, low or zero pressure | 2 | 10 | Development of new source Improvement of Transmission Line | Increase Production and Water Pressure |
| D2.2 | H | M | In Maulong experienced low to zero pressure, especially during peak hours | 4 | 20 | Increase Transmission and/or Distribution Line | Increases pipeline capacity, so does the pressure |
| D2.3 | H | M | Parts of Mercedes (high elevated areas) experienced low to zero pressure, especially during peak hours | 4 | 20 | Increase Transmission and/or Distribution Line | Increases pipeline capacity, so does the pressure |
| D2.4 | H | M | Elevated areas in Brgy. 13 experienced low to zero pressure, especially during peak hours | 5 | 20 | Improvement of water supply system for elevated areas. Installation of Booster Pump (Diversion Road Pumping Station is pending due to the issues on lot ownership) | Increases pipeline capacity, so does the pressure |
| D2.5 | H | M | Bunuanan area experienced low to zero pressure, especially during peak hours | 4 | 20 | Improvement of water supply system for Bunuanan - Cal-Apog (Replacement of Distribution Line) Additional Well in the southern part of the service area | Increases pipe capacity and water pressure Increases production for water supply |
| D2.6 | L | M | Back flow from customer's unmaintained elevated (over-head) tanks especially during low or zero pressure | 3 | 15 | Installation of Check Valve | Identification of customers with over-head tank for the installation of CV to avoid back flow |
| D2.7 | H | M | Back flow from consumer's alternative and untreated water source | 5 | 25 | Installation of Check Valve | Identification of customers with alternative and untreated water sources (Deep Well or Dug Well) for the |

| | | | | | | | |
|--|---|---|--|---|----|--|--|
| | | | | | | | installation of CV to avoid back flow |
| D.3 QUALITY CONTROL OF MATERIALS FOR LEAK REPAIR AND INSTALLATION | | | | | | | |
| D3.1 | H | M | Entry of small animals and insects in Pipes stored at the stockyard | 4 | 12 | Proper storage of pipes and provision of plastic covers | Plastic covers will avoid entry of animals that may contaminate the pipes |
| D.4 MAINTENANCE OF DISTRIBUTION AND APPURTENANCES | | | | | | | |
| D4.2 | H | M | Entry of garbage and other contaminants in open hydrants and blow-off valves | 4 | 20 | Installation of Fire Hydrant/Blow-Off Valve Cover and Valve Box covers | Covers will minimize the risk of contamination |
| D4.3 | H | M | Cross-connection with dilapidated and abandoned water pipes | 3 | 15 | Conduct survey and investigation for the Identification of abandoned pipes and/or service connection Continuous rehabilitation and/or replacement of Dilapidated Pipeline | Identification of pipe ageing and status to determine which pipeline need to be prioritized for the outright rehabilitation or replacement. Rehabilitation will minimize leakages that causes entry of contaminants |
| D4.4 | H | M | Pipes and Meter Stands submerged or traversed along drainage canal | 3 | 15 | Continuous transfer and/or relocation of meter stands submerged/transverse along the drainage canal | Relocation of pipeline and meter stand along drainage canal will the risk of contamination |

Risk Prioritization & Hazards Table:

| Priority Level | Priority Type | Risk Score | Action Levels | Hazards |
|-----------------------|----------------------|-------------------|--|----------------------|
| 1 | High (H) | 15-25 | The risk requires immediate control measures | Microbial (M) |
| 2 | Moderate (M) | 6-14 | The risk requires determination of additional control measure | Chemical (C) |
| 3 | Low (L) | 1-5 | Risk should be documented and requires revisiting in the future | Physical (P) |

5. IMPROVEMENT PLANS

| Risk Ref | Priority | Hazard | Hazardous Event(Source of Hazard) | Action to be Taken (Name of Project) | Funding Source - Cost | Responsible Party - Target Due/Completion Date |
|---------------------------------|----------|--------|--|---|-------------------------------|--|
| S. WATER SOURCES | | | | | | |
| S.1 CARAMAYON I (SPRING) | | | | | | |
| S1.1 | L | M | Seepage of animal and human wastes in the existing sink holes near the source | Conduct Survey for Site Identification and Classification of Sink Holes | ICGF - ₱300,000.00/year | Eng'g Division and Water Quality/ Production Division - December 2023 |
| S1.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping station which could lead to contamination, sabotage (poisoning) and vandalism of pumping station's equipment | Installation of Perimeter Fence | ICGF - ₱500,000.00 | Engineering Division - July 2022 |
| S1.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timer Poaching activities which could lead to changes in the physical quality (High Turbidity) of water | Periodic Consultative Meeting with DENR and LGU regarding the implementation of ordinances, laws, rules and regulations | ICGF - ₱50,000.00 | WSP Team - Semi-Annual |
| S1.4 | H | C | Fish poisoning activities near the source resulting to water contamination | Periodic Consultative Meeting with Department of Agriculture regarding implementation of laws, rules and regulations | ICGF - ₱50,000.00 | WSP Team - Annually |
| S1.6 | L | P | Well Casing damage due to wear and tear | Procurement of Spare Unit | ICGF - ₱200,000.00 | Eng'g. Division and BAC - Once every 10- years |

| S.2 MASACPASAC (SPRING) | | | | | | |
|------------------------------------|---|---|---|---|-------------------------------|--|
| S2.1 | L | M | Seepage of animal and human wastes in the existing sink holes near the source | Conduct Survey for Site Identification and Classification of Sink Holes | ICGF - ₱300,000.00/year | Eng'g Division and Water Quality/ Production Division - December 2023 |
| S2.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping station which could lead to contamination, sabotage (poisoning) and vandalism of catchment | Installation of Perimeter Fence | ICGF - ₱50,000.00 | Engineering Division - July 2022 |
| S2.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timer Poaching activities which could lead to changes in the physical quality (High Turbidity) of water | Periodic Consultative Meeting with DENR and LGU regarding the implementation of ordinances, laws, rules and regulations | ICGF - ₱50,000.00 | WSP Team - Semi-Annually |
| S.3 KULADOR (SURFACE WATER) | | | | | | |
| S3.1 | L | M | Seepage of animal and human wastes in the existing sink holes near the source | Conduct Survey for Site Identification and Classification of Sink Holes | ICGF - ₱300,000.00/year | Eng'g Division and Water Quality/ Production Division - December 2023 |
| S3.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping station which could lead to contamination, sabotage (poisoning) and vandalism of station's facilities | Construction of Perimeter Fence | ICGF - ₱200,000.00 | Engineering Division - July 2022 |
| S3.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timer Poaching activities which could lead to changes in the physical quality (High | Periodic Consultative Meeting with DENR and LGU regarding the implementation of ordinances, laws, rules and regulations | ICGF - ₱50,000.00 | WSP Team - Semi-Annually |

| | | | | | | |
|-----------------------------------|---|---|--|---|-------------------------------|--|
| | | | Turbidity) of water | | | |
| S.4 TUMALISTIS (DEEP WELL) | | | | | | |
| S.4.2 | H | M | Existence of Septic Tanks within the 25-meter radius from the Well leading to water contamination | Periodic Consultative Meeting with LGU (Engineering & Health) regarding the implementation of ordinances | ICGF - ₱50,000.00 | WSP Team - Semi Annually |
| S.4.3 | L | P | Presence of naturally occurring Iron Bacteria affecting water quality | Procurement of Gadget to Control Occurrence of Iron Bacteria at the Well | ICGF - ₱250,000.00 | Eng'g Division and BAC - Year 2022 |
| S.5 CARAMAYON II (SPRING) | | | | | | |
| S5.1 | L | M | Seepage of animal and human wastes in the existing sink holes near the source | Conduct Survey for Site Identification and Classification of Sink Holes | ICGF - ₱300,000.00/year | Eng'g Division and Water Quality/ Production Division - December 2023 |
| S5.2 | H | C | Entry of wildlife and unauthorized persons inside the pumping station which could lead to contamination, sabotage (poisoning) and vandalism of pumping station's equipment | Installation of Perimeter Fence | ICGF - ₱500,000.00 | Engineering Division - July 2022 |
| S5.3 | M | P | Soil erosion due to Kaingin, Charcoal-Making, and Timer Poaching activities which could lead to changes in the physical quality (High Turbidity) of water | Periodic Consultative Meeting with DENR and LGU regarding the implementation of ordinances, laws, rules and regulations | ICGF - ₱50,000.00 | WSP Team - Semi-Annual |
| S5.4 | H | C | Fish poisoning activities near the source resulting to water contamination | Periodic Consultative Meeting with Department of Agriculture regarding implementation of laws, rules and regulations | ICGF - ₱50,000.00 | WSP Team - Annually |
| S.6 EXECUTIVE (DEEP WELL) | | | | | | |
| S6.1 | H | C | Entry of wildlife and unauthorized persons inside the pumping | Construction of Perimeter Fence | ICGF - | WSP Team - |

| | | | | | | |
|--|---|---|--|--|---|---|
| | | | stations which could lead to contamination sabotage (poisoning) and vandalism of station's equipment | | ₱70,000.00 | Year 2022 |
| S6.2 | H | M | Existence of Septic Tanks within the 25-meter radius from the Well leading to water contamination | Periodic Consultative Meeting with LGU (Engineering & Health) regarding the implementation of ordinances | ICGF - ₱50,000.00 | WSP Team - Semi Annually |
| S.7 LAGUNDI (DEEP WELL) | | | | | | |
| S7.2 | H | M | Existence of Memorial Park within the 25-meter radius from the Well leading to water contamination | Periodic Consultative Meeting with LGU (Engineering & Health) regarding the implementation of ordinances | ICGF - ₱50,000.00 | WSP Team - Semi Annually |
| S.8 PAYAO (DEEP WELL) | | | | | | |
| S8.1 | H | C | Entry of wildlife and unauthorized persons inside the pumping stations which could lead to contamination sabotage (poisoning) and vandalism of station's equipment | Construction of Perimeter Fence | ICGF - ₱100,000.00 | WSP Team - Year 2022 |
| S8.2 | H | M | Existence of Septic Tanks within the 25-meter radius from the Well leading to water contamination | Periodic Consultative Meeting with LGU (Engineering & Health) regarding the implementation of ordinances | ICGF - ₱50,000.00 | WSP Team - Semi Annually |
| T. WATER TREATMENT | | | | | | |
| T.1 MAINTENANCE OF CLARIFIER SYSTEM | | | | | | |
| T1.1 | L | P | High Turbidity due to insufficient filtration capacity (only 50% of the total production) | Provide Additional Treatment Facility Purchase 3-spare units Dosing Pumps (PAC, Polymer and Caustic Soda) | ICGF - ₱3,500,000.00 ₱240,000.00 | Eng'g. Division and BAC - December 2021 |
| T.3 DISINFECTION OF FINISHED PRODUCTS | | | | | | |
| T3.1 | M | M | Proliferation of Pathogens caused by under dosing of Chlorine and clogged or defective Chlorinator | Purchase of 5-spare units of Chlorinator (High Head) | ICGF - ₱400,000.00 | Eng'g. Division and BAC - February 2022 |

| T.4 QUALITY CONTROL OF TREATMENT CHEMICALS | | | | | | |
|--|---|---|--|--|---|--|
| T4.2 | H | M | Reduced quality of treatment chemicals due to lack proper storage leading to exposure to rain, humidity, etc. | Construction of Additional Storage Facility at San Andres | ICGF - ₱150,000.00 | Eng'g. Division - June 2022 |
| D. DISTRIBUTION | | | | | | |
| D.1 BURST AND LEAKS | | | | | | |
| D1.1 | H | M | Ingress of contamination during leak repair near drainage canals | Relocation of all existing pipelines along drainage canals Installation of Control Valves along the Distribution Line | ICGF - ₱1,000,000.00 ₱500,000.00 | Eng'g. Division - December 2023 December 2022 |
| D1.2 | H | M | Low workmanship and unhygienic practices in leak repair | Skills/Competence Training and Refresher courses | ICGF - ₱100,000.00 | Administrative Division And HR Section - Year 2022-2023 |
| D1.3 | H | M | Entry of contaminants due to leaks caused by vandalism or infrastructure projects of other Government Agencies (DPWH, PEO, CEO) and other private entities | Enter into an agreement with other concerned government agencies that considered to be effluent to the water system | ICGF - ₱50,000.00 | Administrative Division - Year 2023 |
| D1.4 | H | M | Entry of contaminants due to leaks caused by old and dilapidated pipes | Pipe ageing and status must be determined Continuous Rehabilitation and Replacement of Dilapidated Pipes | ICGF - ₱1,000,000.00 | Eng'g. Division - Year 2023 |
| D.2 WATER DISTRIBUTION PRESSURE | | | | | | |
| D2.1 | H | M | Entry of contaminants in the Distribution Lines caused by intermittent, low or zero pressure | Development of new source Improvement of Transmission Line | ICGF - ₱5,582,790.00 | Eng'g. Division - Year 2025 |
| D2.2 | H | M | In Maulong experienced low to zero pressure, especially during peak hours | Increase Transmission and/or Distribution Line | ICGF - ₱1,883,250.00 | Eng'g. Division - Year 2024 |

| | | | | | | |
|--|---|---|--|---|----------------------------|---|
| D2.3 | H | M | Parts of Mercedes (high elevated areas) experienced low to zero pressure, especially during peak hours | Increase Transmission and/or Distribution Line | ICGF - ₱2,720,250.00 | Eng'g. Division - Year 2024 |
| D2.4 | H | M | Elevated areas in Brgy. 13 experienced low to zero pressure, especially during peak hours | Improvement of water supply system for elevated areas. Installation of Booster Pump (Diversion Road Pumping Station is pending due to the issues on lot ownership) | ICGF - ₱720,000.00 | Eng'g. Division - Year 2021 |
| D2.5 | H | M | Bunuanan area experienced low to zero pressure, especially during peak hours | Improvement of water supply system for Bunuanan - Cal-Apog (Replacement of Distribution Line) Additional Well in the southern part of the service area | ICGF - ₱2,996,460.00 | Eng'g. Division - Year 2023 |
| D2.6 | L | M | Back flow from customer's unmaintained elevated (over-head) tanks especially during low or zero pressure | Installation of Check Valve | ICGF - ₱100,000.00 | Eng'g Division - Year 2022-2023 |
| D2.7 | H | M | Back flow from consumer's alternative and untreated water source | Installation of Check Valve | ICGF - ₱100,000.00 | Eng'g Division - Year 2022-2023 |
| D.3 QUALITY CONTROL OF MATERIALS FOR LEAK REPAIR AND INSTALLATION | | | | | | |
| D3.1 | H | M | Entry of small animals and insects in Pipes stored at the stockyard | Procurement of plastic covers | ICGF - ₱50,000.00 | Engineering Division - As the need arises |
| D.4 MAINTENANCE OF DISTRIBUTION AND APPURTENANCES | | | | | | |
| D4.2 | H | M | Entry of garbage and other contaminants in open hydrants and blow-off valves | Installation of Fire Hydrant/Blow-Off Valve Cover and Valve Box covers | ICGF - ₱100,000.00 | Eng'g Division - Year 2021-2022 |
| D4.3 | H | M | Cross-connection with dilapidated and abandoned water pipes | Conduct survey and investigation for the Identification of abandoned pipes and/or service connection | ICGF - | Commercial Division (Investigator) - |

| | | | | | | |
|------|---|---|--|---|--------------------------|---------------------------------|
| | | | | Continuous rehabilitation and/or replacement of Dilapidated Pipeline | ₱275,000.00 | Annually |
| D4.4 | H | M | Pipes and Meter Stands submerged or traversed along drainage canal | Continuous transfer and/ or relocation of meter stands submerged/ transverse along the drainage canal | ICGF - ₱100,000.00 | Eng'g Division - Annually |

6. OPERATIONAL MONITORING AND CORRECTIVE ACTIONS OF CONTROL MEASURES

| Descriptions | Parameters and Critical Limits | Monitoring Locations - Monitoring Frequency | Responsible Party - Monitoring Procedures | Corrective Actions |
|------------------------------------|--|---|--|---|
| Water Source/ Catchment | High Turbidity Level (Permissible Limit – 5NTU) | Caramayon I - Daily Monitoring | Source/Pump Operator - Water sampling & testing using Portable Turbidimeter with Fast Tracker | 1. Greater than 5NTU – By-pass thru Clarifier System for treatment 2. For 500NTU and above – Temporary Shut-off operation |
| | Power Interruption | Caramayon - Daily Monitoring | Source/Pump Operator - Record date and time of power outage | 1. Inform Engineering (Production) Head for proper coordination with Samelco II to restore power 2. Use Stand-by power (Generator Set) 3. Installation of Insulated High Tension Wire along the cross arms of electrical posts 4. Periodic Line clearing (vegetation) along the power line |
| | Preventive Maintenance of Pumping Station's equipment and other Electrical Appurtenances | Caramayon - Daily Monitoring | Source/Pump Operator - Record Operating Hours, and Electro-Mechanical Parameters/Data | 1. Ensure enough fuel 2. Ensure Stand-by power (Generator Set) is in good running condition 3. Ensure availability of spare pumps and motors 4. Request to conduct Energy Audit (DOST-RO8) |
| | Physical-Chemical Tests | All Sources - Once a year | Laboratory Technician - 1. Water Sampling 2. Submit Samples to DOH Accredited Laboratory Center for testing 3. Submit Test Results to LWUA and CHO | 1. For compliance (LWUA and DOH) 2. For parameters not compliant with the standards, inject additional treatment chemicals |

| | | | | |
|---------------------------|---|-------------------------------------|--|--|
| | | | | |
| | Microbiological Test | All Sources - Monthly | Laboratory Technician - 1. Water Sampling 2. Submit Samples to DOH Accredited Laboratory Center for testing 3. Submit Test Results to LWUA and CHO | 1. For compliance (LWUA and DOH) 2. For Positive Result – Conduct Investigation and Resampling to verify source or reason of contamination for immediate dispositive action thereat |
| Water Treatment | High Turbidity Level (Permissible Limit – 5NTU) | Kulador - Daily Monitoring | Source/Pump Operator - Water sampling & testing using Portable Turbidimeter with Fast Tracker | 1. Dosing of PAC, Caustic Soda and Polymer depending on the turbidity level for treatment. 2. Conduct Pre and Post Chlorination Procedure 3. Replacement and Cleaning of Filter Bags using Pressure Washer |
| | Clogging of Chlorinator Nozzle | Kulador - Daily Monitoring | Source Operator - Conduct Regular Check-up, Cleaning and proper mixing of Granular Chlorine | 1. Pull-out Chlorinator for cleaning 2. Use Stand-by for continuous water disinfection |
| | Physical-Chemical Tests | Treatment Plant - Once a year | Laboratory Technician - 1. Water Sampling 2. Submit Samples to DOH Accredited Laboratory Center for testing 3. Submit Test Results to LWUA and CHO | 1. For compliance (LWUA and DOH) 2. For parameters not compliant with the standards, inject additional treatment chemicals (food grade) |
| | Microbiological Test | Treatment Plant - Monthly | Laboratory Technician - 1. Water Sampling 2. Submit Samples to DOH Accredited Laboratory Center for testing 3. Submit Test Results to LWUA and CHO | 1. For compliance (LWUA and DOH) 2. For Positive Result – Conduct Investigation and Resampling to verify source or reason of contamination for immediate dispositive action thereat |
| Water Distribution | Chlorine Residual (Permissible) | 20 Sampling Points | Laboratory Technician | 1. Below minimum |

| | | | | |
|-----------------|--|---|--|---|
| | Limit – 0.30 to 1.50ppm) | - Daily Monitoring | - 1. Water Sampling and Testing using HACH Tester 2. Included in the Daily Laboratory Test Report | permissible limit – Inform Pump Operator to increase Chlorine dosage 2. Above maximum permissible limit – Inform Pump operator to decrease Chlorine dosage |
| | Physical-Chemical Tests | Customer's Tap - Once a year | Laboratory Technician - 1. Water Sampling 2. Submit Samples to DOH Accredited Laboratory Center for testing 3. Submit Test Results to LWUA and CHO | 1. For compliance (LWUA and DOH) 2. For parameters not compliant with the standards, inject additional treatment chemicals (food grade) |
| | Microbiological Test | Customer's Tap - Monthly | Laboratory Technician - 1. Water Sampling 2. Submit Samples to DOH Accredited Laboratory Center for testing 3. Submit Test Results to LWUA and CHO | 1. For compliance (LWUA and DOH) 2. For Positive Result – Conduct Investigation and Resampling to verify source or reason of contamination for immediate dispositive action thereat. |
| Consumer | New Water Service Connections (NWSC) 1. Installation of "After the Meter Pipeline" 2. Installation of Inside Plumbing Fixtures 3. Use of Alternative/ Untreated Source 4. Use of Over-Head Tanks | Site of Installation - During Processing of Application | Plumbers & Investigators - 1. Investigation 2. Inspection 3. Survey | 1. Advise Applicant/s for the proper laying of pipeline (after the meter) 2. Required Applicant/s for Barangay Certification 3. Advise Applicant/s to use standard pipes & fitting materials 4. Advise Applicant/s not to interconnect their additional (if any) water sources (Deep Well or Dug Well) 5. Advise Applicant/s to periodically clean their overhead tank (if any) |

7. VERIFICATION PROCEDURES

To assure that the general operation and design system is efficiently followed to supply safe and potable water to its consumers, the WSP Team performs verification that comprises the following activities:

1. Compliance Monitoring – a plan which is consistent with water quality targets
2. Verification Monitoring Program – this are activities necessary to determine WSP compliance with the existing standards
3. Internal and External Audit Plans – an assessment and a compliance checking role. The frequency of audit depends on the level of confidence required by the District and the regulatory body.

7.1 COMPLIANCE MONITORING PLAN CONSISTENT WITH WATER QUALITY TARGETS

| Activity | Description | Frequency of Monitoring | Responsible Party | Records |
|---|--|--|--|---|
| Physical-Chemical Test | <p>Check the test result of 9-Mandatory Parameters and Additional Parameters (as determined by LDMWQMC) for its compliance with the standards (Permissible Limit)</p> <ol style="list-style-type: none"> 1. Arsenic 2. Cadmium 3. Lead 4. Nitrate 5. Color (Apparent) 6. Turbidity 7. pH 8. Total Dissolved Solids 9. Disinfection Residual | Once a year (Treatment/Source/ Customer's Tap) | DOH Accredited Laboratory Testing Center | Test Results submitted to LWUA & CHO (with File on Record) |
| Bacteriological Test using PHC Bottle | Monitor the Presence/Absence of E.Coli in Product Water samples | Twice a week in 12 sampling locations/points | Laboratory Technician | Test Results submitted to CHO for Conformance (with file on record) |
| Microbiological Test – Accredited Laboratory Center | Monitor and Analyse the Presence/Absence of E.Coli in Product Water samples | Once a month (refer to table) | DOH Accredited Laboratory Testing Center | Test Results submitted to LWUA & CHO (with File on Record) |
| Water Quality Monitoring | <p>Check and Monitor 6-parameters of water samples for its compliance with the standards (Permissible Limit)</p> <ol style="list-style-type: none"> 1. Chlorine Residual 2. Salinity 3. Conductivity 4. Total Dissolved Solids 5. Turbidity 6. pH | Daily in 20 Sampling Locations/Points | Laboratory Technician | For management monitoring and attachment to LWUA Report |
| Physical-Chemical Test (Proposed New Sources) | Check the test result of 9-Mandatory Parameters for its compliance with the standards (Permissible Limit) | As needed/required (Proposed Source) | DOH Accredited Laboratory Testing Center | Basis for decision-making |

7.2 VERIFICATION MONITORING PROGRAM

| Verification Activity | Location of Activity | Type of Activity | Frequency of Activity | Analyst | Recipient of Analysis Result | Action of Unusual/ Failing Result | 3 rd -Party Recipient of Results |
|---|--|--|--|--|--------------------------------|---|---|
| Water Quality | | | | | | | |
| Physical-Chemical Test | Treatment Plant/Source/ Customer's Tap | Water Sampling and Testing | Once a year | DOH Accredited Laboratory Testing Center | Manager - Engineering Division | Protocols for Water Parameters Permissible Limits | Production Manager, General Manager, LWUA & CHO |
| Bacteriological Test using PHC Bottle | Sources/ Consumer's Tap (Randomly selected per designed sampling plan) | Water Sampling and Testing | Twice a week | Laboratory Technician | Manager - Engineering Division | Protocols for Positive Results | General Manager & CHO |
| Microbiological Test | Sources/ Consumer's Tap (Randomly selected per designed sampling plan) | Water Sampling and Testing | Monthly | DOH Accredited Laboratory Testing Center | Manager - Engineering Division | Protocols for Positive Results | General Manager, LWUA & CHO |
| Water Quality Monitoring | Sources/ Consumer's Tap (Randomly selected per designed sampling plan) | Water Sampling and Testing | Daily | Laboratory Technician | Manager - Engineering Division | Protocols for Positive Results | General Manager, LWUA & CHO |
| Physical-Chemical Test (for new/proposed sources) | Drilling Site | Water Sampling and Testing | As needed/ required | DOH Accredited Laboratory Testing Center | Manager - Engineering Division | Protocols for Water Parameters Permissible Limits | General Manager |
| Internal and External Audit | | | | | | | |
| Internal Audit | Sources/ Facilities/ Transmission/ Distribution/ Service Area | Auditing | Annually | Independent Auditor or Personnel not directly involved or member of the WSP Team | General Manager | Compliance with the audit recommendation | General Manager |
| External Audit | Sources/ Facilities/ Transmission/ Distribution/ Service Area | Auditing | Adapt the joint guidelines of DOH and LWUA | External Auditor designated by DOH and LWUA | General Manager | Compliance with the audit recommendation | DOH and LWUA |
| Customer's Satisfaction | | | | | | | |
| Monitoring of Consumer's Satisfaction | Service Area | Commissioning a Customer Satisfaction Survey | Monthly | Front Desks | Manager – Commercial Division | Review Processes and Address specific area of Dissatisfaction | General Manager |

Laboratory Tests conducted by a DOH Accredited Laboratory Centers

| Activity | Description | Frequency | Responsible party |
|--------------------------------------|-----------------------|-------------|-------------------------|
| Physical – Chemical Test by External | Compliance with PNSDW | Once a year | City Health Office/LWUA |
| Microbiological Test by External | Compliance with PNSDW | Monthly | City Health Office/LWUA |

7.3 INTERNAL AND EXTERNAL AUDIT PLANS

Internal and external auditing started as part of the quality management structure and incorporated in all of the water supply system's strategies. Auditing provides a scrutiny, study, research, examination, analysis and inquiry to check that the WSP is complete, updated and shall implemented effectively in accordance with the WSP plans and programs. It can have both an assessment and a compliance-checking role, and its frequency shall depend on the level of confidence required by the Regulatory Bodies and District (CWD Management) Itself.

Internal WSP Audit

An independent audit led by a knowledgeable and competent personnel of the District shall assess, check, review all relevant documents and processes of the WSP annually. The Auditors shall prepare report and recommendation using the Audit Tool Box and shall submit the same to the management for reference and management action when necessary.

External WSP Audit

The District shall create a WSP Monitoring Team that shall monitor the implementation of the WSP annually.

The District shall adopt the DOH-LWUA joint guidelines upon its effectivity. The frequency of the audit shall be base on the said guidelines, conducted by the designated Auditor/s by said regulatory bodies, and all audit findings and the corresponding recommendations shall be strictly complied by the District immediately.

| Points | Internal Audit | External Audit |
|-----------|---|---|
| Scope | The scope is determined by the Management | The scope is determined by the relevant law |
| Objective | To detect and prevent errors and frauds | To mainly show fair and true view of accounting record |
| Duration | Conducted for any time of duration | Conducted only for a certain or specific period of time |
| Reports | The report is submitted to the Management | The report is submitted to the Shareholders |

7.3.1 Internal Audit Process

- Defines the internal audit **process**
- Lists **responsibilities** of participants
- Defines Auditor's **qualifications**
- Identifies the **process** for performing internal audits
- Identifies related **documents** and quality **records**

7.3.2 External Audit Process

- Audit Opening
 - * Notification
 - * Initial Discussion
 - * Audit Plan
 - * Opening Conference
- Performing the Audit
 - * Fieldwork
- Reporting Results
 - * Interim Findings/Draft Report
 - * Closing Conference
 - * Final Audit Report
- Corrective Action
 - * Action Plan
 - * Follow-up Audit/Review

8. MANAGEMENT PROCEDURES

Management procedures or simply known as Standard Operating Procedures (SOPs) are procedure specific to the operation that refers to the activities necessary to complete the tasks in accordance with the existing industry standards, parameters, laws and rules. Such procedures are properly documented which are periodically updated for the implementation of the District improvement plans, review of incidents, emergencies and close adversities. Also included is the documentation of the system assessment, monitoring and other supporting program.

To sustain CWD's effectiveness and efficiency in providing safe and potable water in the City of Catbalogan, it is a must to perform regular monitoring of the operation processes and perform the necessary corrective actions for any deviation and the same shall be properly documented or recorded with detailed work instructions for future reference, or as the need arises.

8.1 CORRECTIVE ACTIONS – FOR NORMAL OPERATION ACTIVITIES

Corrective actions are activities and programs or simply action taken to preclude occurrences of an identified hazard or to prevent recurrence of a problem. There are five steps for effective corrective actions during normal operation activities;

1. Clearly **Describe** the problem/s
2. Immediately **Stop** the problem from accelerating
3. **Establish** what Caused the Problem
4. **Determine and Implement** action to prevent from re-occurring
5. **Review** the effectiveness of the corrective action taken

For the Standard Operating Procedures (SOPs) during normal operation activities, please refer to Annex G (Operation's Manual) Section 3.3 Operating Procedures of System Operations Overview.

8.2 RESPONSE PLANS – FOR EMERGENCY OPERATION ACTIVITIES

Ideally, an emergency response plan promotes safety awareness and shows the District's commitment to the safety of its employees, facilities, equipment and other properties. It is a documented series of steps the District will take during a critical event to ensure employees' safety and minimize the impact on critical operations. Taking a proactive approach to emergency response planning ensures the best possible outcomes for the employees and the District and allows the Manager and its Team to think holistically regarding any situation and account for a multitude of variables.

The best emergency response plan shall include who to contact, evacuation routes, how to act during an emergency, how to mitigate the risks to people and properties, and a detailed communication procedures during and after the emergency occurs. It shall also specify which staff members that should be part of the response team for a particular event or emergency and which responders should be first contacted.

The District identified the following important aspects for an efficient Emergency Response Plan;

1. **Prevent** fatalities and injuries
2. **Reduce** damage to buildings, stock, and equipment
3. **Protect** the environment and the community
4. **Accelerate** the resumption of normal operations

For the detailed emergency responses, preparedness, mitigation/prevention and recovery, please refer to the following annexes:

- Annex H (Catbalogan Water District – Disaster Risk Reduction Management Plan or CWD-DRRMP);
- Annex I (BOD Resolution Approving the Policy of Safeguarding and Securing Chemicals, Equipment and other Combustible Materials of the District);
- Annex J (IRR of BOD No. 56, series of 2018 re: Policy of Safeguarding and Securing Chemicals, Equipment and other Combustible Materials of the District”; and
- Annex K (Manual on First Aid for Chlorine-Related Injuries)

| Standard Operating Procedures | Description | Document Reference |
|--------------------------------------|---|---|
| <p>Water Source Operation</p> | <p>Caramayon I (Spring)</p> <ol style="list-style-type: none"> 1. Operating Procedure 2. Electro-Mechanical Data Monitoring and Recording 3. Equipment Preventive Maintenance 4. Production Monitoring and Recording 5. Water Quality Monitoring <p>Masacpasac (Spring)</p> <ol style="list-style-type: none"> 1. Valving Exercise (Gravity) 2. Maintenance of Impounding Structure 3. Maintenance of Intake Box 4. Production Monitoring and Recording <p>Kulador (Surface Water)</p> <ol style="list-style-type: none"> 1. Valving Exercise (Gravity) 2. Maintenance of Impounding Structure 3. Production Monitoring and Recording 4. Maintenance of Intake Box 5. Maintenance of Facility 6. Water Sampling Procedure 7. Water Quality Monitoring 8. Water Treatment Procedures <p>Tumalistsis (Deep Well)</p> <ol style="list-style-type: none"> 1. Pumping Operation 2. Valving (Schedule of Distribution/Pumping) 3. Monitoring and Reporting of Static Water Level and Drawdown 4. Production Monitoring and Recording 5. Maintenance of Facility 6. Water Sampling Procedure 7. Disinfection (Chlorination) 8. Water Quality Monitoring 9. Electro-Mechanical Data Monitoring and Recording <p>Caramayon II (Spring)</p> <ol style="list-style-type: none"> 1. Operating Procedure 2. Electro-Mechanical Data Monitoring and Recording 3. Equipment Preventive Maintenance 4. Production Monitoring and Recording 5. Water Quality Monitoring <p>Executive (Deep Well)</p> <ol style="list-style-type: none"> 1. Pumping Operation 2. Valving (Schedule of Distribution/Pumping) 3. Monitoring and Reporting of Static Water Level and Drawdown 4. Production Monitoring and Recording 5. Maintenance of Facility 6. Water Sampling Procedure 7. Disinfection (Chlorination) 8. Water Quality Monitoring 9. Electro-Mechanical Data Monitoring and Recording <p>Lagundi (Deep Well)</p> <ol style="list-style-type: none"> 1. Pumping Operation 2. Valving (Schedule of Distribution/Pumping) 3. Monitoring and Reporting of Static Water Level and Drawdown | <p>Operations Manual (OM) Annex “G”</p> |

| | | |
|-------------------------------|---|-------------------------------------|
| | <ol style="list-style-type: none"> 4. Production Monitoring and Recording 5. Maintenance of Facility 6. Water Sampling Procedure 7. Disinfection (Chlorination) 8. Water Quality Monitoring 9. Electro-Mechanical Data Monitoring and Recording <p>Payao (Deep Well)</p> <ol style="list-style-type: none"> 1. Pumping Operation 2. Valving (Schedule of Distribution/Pumping) 3. Monitoring and Reporting of Static Water Level and Drawdown 4. Production Monitoring and Recording 5. Maintenance of Facility 6. Water Sampling Procedure 7. Disinfection (Chlorination) 8. Water Quality Monitoring 9. Electro-Mechanical Data Monitoring and Recording | |
| Production House | <ol style="list-style-type: none"> 1. Maintenance of Facility 2. Production Monitoring and Recording (6:00 AM & 6:00 PM) | Operations Manual (OM) Annex "F" |
| Treatment Operation | <p>Kulador Treatment Plant (Clarifier System)</p> <ol style="list-style-type: none"> 1. Clarifier System Operation 2. Post Chlorination 3. Dosing of Water Treatment Chemicals <p>Tumalistis Pumping Station</p> <ol style="list-style-type: none"> 1. Pre and Post Chlorination <p>Lagundi Pumping Station</p> <ol style="list-style-type: none"> 1. Post Chlorination <p>Payao Pumping Station</p> <ol style="list-style-type: none"> 1. Post Chlorination | Operations Manual (OM) Annex "G" |
| Transmission Main Line | <ol style="list-style-type: none"> 1. Valve Exercise 2. Water Main Repair Procedure 3. Repair/Replacement of Burst/Leaking Water Mains | Operations Manual (OM) Annex "G" |
| Booster Pumps | <p>V & G</p> <ol style="list-style-type: none"> 1. Pump Operation 2. Maintenance of Facility and Equipment 3. Monitoring and Recording of Water Supplied <p>Canlapwas</p> <ol style="list-style-type: none"> 1. Pump Operation 2. Monitoring and Recording of Electro-Mechanical Parameters and Water Pressure 3. Maintenance of Electro-Mechanical Equipment 4. Dewatering of Pump Housing Structure (Sump Tank) <p>Mabini</p> <ol style="list-style-type: none"> 1. Pump Operation 2. Monitoring and Recording of Electro-Mechanical Parameters and Water Pressure 3. Maintenance of Electro-Mechanical Equipment 4. Dewatering of Pump Housing Structure (Sump Tank) <p>Cogao</p> <ol style="list-style-type: none"> 1. Pump Operation 2. Monitoring and Recording of Electro-Mechanical Parameters, Water Pressure and Water Discharge (Darahuway Dako and Darahuway Guti) 3. Maintenance of Electro-Mechanical Equipment <p>Antiao</p> <ol style="list-style-type: none"> 1. Pump Operation 2. Maintenance of Electro-Mechanical Equipment and Appurtenances 3. Monitoring and Recording of Electro-Mechanical Parameters and Water Pressure | Operations Manual (OM) Annex "G" |
| Distribution Line | <ol style="list-style-type: none"> 1. Repair Burst/Leaking 2. Tapping of Service Connection 3. Replacement of Dilapidated Pipelines 4. Relocation of Distribution Line 5. Installation of Pressure Gauges 6. Installation of Gate Vales | Operations Manual (OM) Annex "G" |

| | | |
|---------------------------|--|-------------------------------------|
| | 7. Installation of Fire Hydrants | |
| Extension Line | 1. Relocation of Extension Line 2. Repair Burst/Leaking 3. Water Sampling Procedure 4. Tapping of Service Connections 5. Installation of Pressure Gauges 6. Installation of Gate Valves 7. Installation of Blow-Off Valves 8. Installation of Clustered Meters | Operations Manual (OM) Annex "G" |
| Leak Detection | 1. Leak Detection and Reporting 2. Flushing 3. Valving 4. Pressure Monitoring and Reporting 5. Repair Leakage 6. Installation of Pressure Gauges | Operations Manual (OM) Annex "G" |
| Service Connection | 1. Installation of New Water Service Connection (NWSC) 2. Reconnection of Water Service Connection (NWSC/R) 3. Reopen Water Service Connection (Removed/Padlock) 4. Disconnection 5. Meter Stand Repair and Rehabilitation 6. Relocation of Water Meters 7. Investigation of Abrupt Increase/Decrease in Consumption 8. Installation of Pressure Gauges | Operations Manual (OM) Annex "G" |
| Water Meter | 1. Recalibration of New Water Meters 2. Replacement of Water Meters 5-year old 3. Pull-out of reported faulty or defective Water Meters for Calibration 4. Change of Water Meters - Defective 5. Relocation of Water Meters 6. Clustering of Water Meters 7. Recalibration of Disconnected WSC (Removed) before Reinstalling | Operations Manual (OM) Annex "G" |
| Fire Hydrants | 1. Maintenance of Fire Hydrants 2. Hydrants and Valve Exercise (Fire Prevention Month) 3. Provision of Fire Hydrant Cover 4. Flushing | Operations Manual (OM) Annex "G" |
| Blow-Off Valves | 1. Maintenance of Blow-Off Valves 2. Provision of Valve Box Cover 3. Flushing | Operations Manual (OM) Annex "G" |
| Gate Valves | 1. Valve Exercise 2. Maintenance of Gate Valves 3. Replacement of Defective Gate Valves 4. Provision of Valve Box Cover | Operations Manual (OM) Annex "G" |

9. SUPPORTING PROGRAMS

9.1 Plan for Supporting Programmes

| Program | Activity | Purpose | Target Date |
|---|---|---|------------------------------------|
| Hygiene, Sanitation and Safety Gear (PPE) | Strict Implementation of Proper uniform and wearing of safety gears (Personal Protective Equipment) | For Field workers safety, sanitation and hygiene purposes | Regular Activity |
| Research | Geographic Information System (GIS) | Efficiency in the operations | In-Place System, Continue Updating |
| | Computerized Database | | In-Place System, Continue Updating |
| Organizational Culture | Team Building | Enhancing team cooperation and camaraderie within employee and management | Yearly |
| Training & Continuing Education | Program on Employee's Skills Training | Enhancing Employee's skills | Regular Activity |
| | Program on Seminar-Orientation of New Water Service Connection | Customer/Applicants' Proper and Correct Information regarding the | Every Friday (4:00 PM) |

| | | | |
|--|---|--|--|
| | Applicants | District's operations, policies, vision and mission. | |
| | Skills Competition | Enhancing Employee's Skills | Every July of each year (Anniversary Celebration) |
| | Competency Requirements | Enhancing Employee's skills | As need arises |
| Equipment Upgrade, Calibration and Maintenance | Program on Change of 5-year old water meters (Active) | Lowering Non-Revenue Water (NRW) | Regular Activity |
| | Recalibration of Water Meters | Lowering Non-Revenue Water (NRW) | Regular Activity |
| | Night Shift Leak Detection | Lowering Non-Revenue Water (NRW)Lowering NRW | Regular Activity |
| | Flushing | Reduction of Sediments, and Air Accumulation in the Pipeline | After every water interruption/repair of Mainline and High Turbidity |

10. PERIODIC REVIEW OF WSP

The WSP Team and other concerned personnel, shall conduct the annual regular or periodic WP review every third quarter of the year (July-September), however if deem necessary, plan for an interim WSP review shall be undertaking for the following purpose or circumstances:

- Any changes and/or improvement in the water supply system (Catchment, Sources, Pumping Stations, Treatment Plant and other Facilities, Transmission and Distribution Pipelines);
- Any changes and/or revision in the office and/or operating procedures;
- Any changes in the workforce; and
- Any changes or revision in the WSP membership and contact details in information.

11. REVISION OF WSP FOLLOWING AN INCIDENT

Periodically reviewing the WSP ensures that emergent hazards and incidents are properly assessed and addressed. However, incidents and other fortuitous events that affect or can affect water safety may still happen at any given time, thus, aside from the periodic WSP review, a evaluation/examination/assessment following an incident, near miss, or emergency shall be added or done to prevent recurrence of the same incident and/or emergency in the future and it is a determining factor as to whether the response plan was effective or needs further improvement.

The objective of a review following an incident is basically to identify possible areas for improvement, consequently updating and revising the WSP to adapt to the current and future conditions.

Incident – Major problems to water quality or threat to water quality. Violations to any water quality protocols and procedures that pose an acute or immediate risk or danger to public health.

Near Miss – Is not an incident, but rather evidence that an incident may have occurred if it were not for some action/control that has been undertaken. Indicative of something more serious, and is good for learning and correcting.

Emergency – Large scale water-borne disease outbreak. Calamities and disasters that cause damages to structures and facilities that affect water quality and supply.

The following are the WSP Team guide or determining factors following an incident, near miss, or emergency:

- 1.) What is the cause of the incident (is it new or already identified);
- 2.) How the incident was discovered or recognized;
- 3.) What are the actions and how those actions were carried out;
- 4.) Does internal and external communication effective;
- 5.) What are the short and long term consequences of the emergency;
- 6.) What are the improvements needed in risk assessments, control measures and training of personnel; and
- 7.) Assessment of Emergency Response Plan.

Any changes or revision in the plan should be adequately recorded, and shall duly approved by Management and the Policy-making body (Board of Directors), and shall be properly communicated to CWD officers and key personnel and staff for implementation and guidance.

12. ANNEXES

Annex A

Board Resolution No. 70, series of 2016

Resolution Approving the Support in the Preparation and Development of the Water Safety Plan (WSP) for Catbalogan Water District (CWD) and its Implementing Activities

CATBALOGAN WATER DISTRICT
Catbalogan, Samar



OFFICE OF THE BOARD OF DIRECTORS

Board Resolution No. 70
Series of 2016

SUBJECT:

**APPROVING THE SUPPORT IN THE PREPARATION AND DEVELOPMENT
OF THE WATER SAFETY PLAN (WSP) FOR CATBALOGAN WATER
DISTRICT (CWD) AND ITS IMPLEMENTING ACTIVITIES**

WHEREAS, Management hereby recommends for board approval supporting the preparation and development of the Water Safety Plan (WSP) for Catbalogan Water District (CWD) and its implementing activities.

WHEREAS, said policy is authorized under Department of Health Administrative Order No. 2014-0027 dated September 04, 2014 entitled " National Policy on Water Safety Plan (WSP) for All Drinking-Water Service Providers",

WHEREAS, this is further authorized under Local Water Utilities Administration (LWUA) MC No. 010-14 entitled: " Development and Implementation of Water Safety Plan."

WHEREAS, Water Safety Plan is a management tool that can be applied in all types of water systems to ensure the safe quality of supplied water. The WSP uses a comprehensive risk assessment and risk management approach encompassing all steps in water supply from water source (catchment) to consumer. The traditional approach of monitoring water quality at the tap is found to be ineffective because notification comes too late whenever there is contamination. Consumers have already ingested the water before an action could be made.

WHEREAS, WSP can address this gap by ensuring that notification will come on time while addressing the risks by appropriate control measures.

WHEREAS, WSPs objectives are to prevent or minimize contamination of water source, remove contamination thru treatment and prevent re-contamination during storage, distribution and handling of drinking water.

WHEREAS, WSPs are increasingly recognized as a cost-effective, management-oriented, preventive approach to drinking-water safety.

WHEREAS, the Department of Health declared the development and implementation of Water Safety Plan by all drinking-water service providers as a national policy for drinking-water quality management.

NOW THEREFORE, as unanimously moved and seconded by the members of the Board present.

RESOLVED, as it is hereby resolved, approving the support in the preparation and development of the Water Safety Plan (WSP) for Catbalogan Water District (CWD) and its implementing activities.

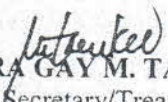
Adopted this 18th day of July 2016.



VICTORIANO C. NAVARRETE
Chairman



JOSE A. MABULAY, JR.
Vice Chairman



MYRA GAY M. TAMBOR
Secretary/Treasurer



ROLANDO T. KO
Director

Annex B
District Memorandum No. 146 dated March 15, 2021
***Revised Composition of the Water Safety Plan
Committee***

CATBALOGAN WATER DISTRICT
Catbalogan, Samar

3/15/2021

District Memorandum No. 146
Series of 2021

To: ALL CONCERNED EMPLOYEES
From: THE GENERAL MANAGER
Subject: REVISED COMPOSITION OF WATER SAFETY PLAN COMMITTEE

In view of the current changes and movement of employees, effective March 15, 2021, the revised composition of the Water Safety Plan Committee are the following:

Team Leader: Engr. Miguel P. Macaspag
Assistant Team Leader: Engr. Herminia S. Tuazon

Committee on Source/Pumping Stations
Head: Engr. Miguel P. Macaspag
Members: Isabelo R. Labangco, Jr.
Bernabe S. Dacles
Herbert R. Maga

Committee on Treatment:
Head: Engr. Herminia S. Tuazon
Member: Zaldy A. Mahinay

Committee on Distributions:
Head: Macario M. Gabunar
Member: Rodolfo R. Panican

Support Committee:
Head: Eusebia Christina G. Yboa
Members: Maria Patria C. Dacallos
Jessamine Q. Costo
Marianne C. Cruz

Documentation Committee:
Engr. Herminia S. Tuazon
Maria Patria C. Dacallos
Marilyn A. Serida

Coordinator: Eusebia Christina G. Yboa

Secretariat: Marilyn A. Serida
Odette L. Tesoro
Maryrose Ann M. Iquiran

For your information:

James


ENGR. RALPH S. UY
General Manager

Annex C
District Memorandum No. 145 dated March 15, 2021
Attendance to Water Safety Plan Workshop

CATBALOGAN WATER DISTRICT
Catbalogan, Samar

3/15/2021

District Memorandum No. 145

Series of 2021

To: ENGR. MIGUEL P. MACASPAG
ENGR. HERMINIA S. TUAZON
ENGR. MARK VINCENT BACALLA
DINAH R. CABRIGAS
JESSAMINE Q. COSTO
EUSEBIA CHRISTINA G. YBOA
MARIA PATRIA C. DACALLOS
DENNIS M. ALA
MARILYN A. SERIDA
MARYROSE ANN N. IQUIRAN

From: THE GENERAL MANAGER

Subject: WATER SAFETY PLAN WORKSHOP

You are hereby informed that we will have a meeting ^{WORKSHOP} starting March 16, 2021 every 1:30 p.m. until completion of Water Safety Plan.

For your information.


ENGR. RALPH S. UY
General Manager

Annex D
Board Resolution No. 23, series of 2021
***Resolution Approving the Adoption of the 2nd Revision of
Water Safety Plan of Catbalogan Water District***



CATBALOGAN WATER DISTRICT
Catbalogan, Samar

OFFICE OF THE BOARD OF DIRECTORS

Board Resolution No. 23
Series of 2021

SUBJECT:

RESOLUTION APPROVING THE ADOPTION OF THE 2ND REVISION OF WATER SAFETY PLAN (WSP) OF CATBALOGAN WATER DISTRICT (CWD)

WHEREAS, Management hereby recommends for board approval the adoption of the 2nd Revision of Water Safety Plan (WSP) of Catbalogan Water District;

WHEREAS, the 1st Water Safety Plan (WSP) was approved by the Department of Health (DOH) on January 16, 2018 and valid until January 15, 2021;

WHEREAS, the members of Water Safety Plan Committee convene and updated the Water Safety Plan after its expiration on January 16, 2021 for its revision and after thorough discussions and deliberations, the 2nd Revision of Water Safety Plan was developed;

WHEREAS, this 2nd Revision of Water Safety Plan (WSP) will be submitted to Local Water Utilities Administration (LWUA) for review and evaluation and then it will be forwarded to Department of Health (DOH) for final approval;

WHEREAS, said policy is authorized under Department of Health Administrative Order No. 2014-0027 dated September 04, 2014 entitled "National Policy on Water Safety Plan (WSP) for All Drinking-Water Service Providers";

WHEREAS, this is further authorized under Local Water Utilities Administration (LWUA) MC No. 010-14 entitled: "Development and Implementation of Water Safety Plan";

WHEREAS, Water Safety Plan is a management tool that can be applied in all types of water systems to ensure the safe quality of supplied water. The WSP uses a comprehensive risk assessment and risk management approach encompassing all steps in water supply from water source (catchment) to consumer. The traditional approach of monitoring water quality at the tap is found to be ineffective because notification comes too late whenever there is contamination. Consumers have already ingested the water before an action could be made;

WHEREAS, WSP can address this gap by ensuring that notification will come on time while addressing the risks by appropriate control measures;

WHEREAS, WSPs objectives are to prevent or minimize contamination of water source, remove contamination thru treatment and prevent re-contamination during storage, distribution and handling of drinking water;

WHEREAS, WSPs are increasingly recognized as a cost-effective, management-oriented, preventive approach to drinking-water safety;


WHEREAS, the Department of Health declared the development and implementation of Water Safety Plan by all drinking-water service providers as a national policy for drinking-water quality management;

[Handwritten signatures and initials on the right margin]


NOW THEREFORE, as unanimously moved and seconded by the members of the Board present,

RESOLVED, as it is hereby resolved, approving the 2nd Revision of the Water Safety Plan (WSP) of Catbalogan Water District.

Adopted this 8th day of April 2021


MYRA GAY M. TAMBOR
Chairperson


JOSE A. MABULAY, JR.
Vice Chairperson


PEDRITO G. PADILLA
Secretary/Treasurer


ROLANDO T. KO
Director


VINCENT G. NAVARRETE
Director

Annex E
Improvement Plans

| | |
|--|--------------|
| 10603110-04 : UPIS - Wells | |
| 1.) Villa Paula Dug Well | 450,000.00 |
| 2.) Masacpasac Well | 236,839.00 |
| 10603110-09 : UPIS - Transmission and Distributions Mains | |
| 1.) Installation of 630LM 8" PVC Transmission Pipeline Mabini Ave. | 1,331,811.00 |
| 2.) Installation of Transmission Pipeline @ Diversion Road (Transformer & other Electrical-Mechanical Appurtenances | 720,000.00 |
| 3.) Installation of Transmission (Masacpasac Line) Pipeline from Nasarang to Culador | 738,700.00 |
| 4.) Concrete Encasement of Transmission Pipeline | 694,000.00 |
| 5.) Replacement of 10, 8, 6" PVC Pipe @ Culador (Damage during Typhoon Urduja - December 16, 2017) | 1,284,400.00 |
| 10603110-11 : UPIS - Services | |
| 1.) Replacement of Dilapidated Pipelines (NRW Program) | 275,000.00 |
| 2.) Leak Detection (NRW Program) | 155,650.00 |
| 10603110-12 : UPIS - Meters | |
| 1.) Replacement of Water Meters (5-years) (NRW Program) | 874,335.00 |
| 2.) Change Water Meters (Defective) (NRW Program) | 874,335.00 |
| 3.) Recalibration of 2-units Electromagnetic Flow Meters (NRW Program) | 231,000.00 |
| 4.) District Metering Area(DMA) (NRW Program) | 977,971.50 |
| 5.) Installation of Water Meter & Accessories @ Fire Hydrant (4-unit) | 500,000.00 |
| 10603110-99 : UPIS - Other Transmission and Distribution Mains | |
| 1.) Installation of 10" Parallel Line from Intake to Culador | 3,750,000.00 |
| 10604070-02 : Pumping Structures and Improvements | |
| On-Line Booster Pumping Station (Ubanon) | |
| Pumping Station | 350,000.00 |
| Electrical & Mechanical Appurtenances (Electrical, Flowmeter, Pipes & Fittings) | 280,000.00 |
| Transformer 25KVA | 150,000.00 |
| 10604070-03 : Water Treatment Structures and Improvements | |
| 1.) Improvement of Culador Impounding Dam, including Rapid Sand Filter (RSF) | 500,000.00 |
| 10605140 : Technical and Scientific Equipment | |
| 1-unit Mobile Ground Water Detector | 120,000.00 |
| 1-unit Iron Bacteria Equipment | 80,000.00 |
| 1-unit Water Leak Detector with Leak Pen | 500,000.00 |
| 10605990-01 : Power Production Equipment | |
| 1.) Rehabilitation of Caramayon Powerline, including Transformer | 1,387,127.50 |
| 10605990-02 : Pumping Equipment | |
| A. Caramayon I Pumping Station | |
| 1.) Pump No. 1 (50HP) | |
| 1-unit Submersible Motor 50HP (Spare) | 350,000.00 |
| 1-unit Variable Frequency Drive 50HP (Spare) | 350,000.00 |
| 2.) Pump No. 2 (50HP) | |
| 1-unit Submersible Motor 50HP (Spare) | 350,000.00 |
| 1-unit Variable Frequency Drive 50HP (Spare) | 350,000.00 |
| 3.) Pump No. 3 (100HP) | |
| 1-unit Submersible Motor 100HP (Spare) | 650,000.00 |
| 1-unit Variable Frequency Drive 100HP (Spare) | 550,000.00 |
| B. Caramayon II Pumping Station | |
| 1-unit Submersible Motor 125HP (Spare) | 770,000.00 |

| | |
|--|------------|
| C. Mabini Booster Pump | |
| 1-unit Submersible Motor 40HP (Spare) | 250,000.00 |
| D. Canlapwas Booster Pump | |
| 1-set CR Pump and Motor 25HP Induction (Spare) | 500,000.00 |
| E. V & G Booster Pump | |
| 1-unit Submersible Pump & Motor 5HP Single Phase (Spare) | 300,000.00 |
| F. Brgy. 13 Reservoir | |
| 1-unit Pump 2HP | 30,600.00 |
| 1-unit Motor 2HP | 39,900.00 |
| 1-unit Controller 2HP | 20,500.00 |
| G. Tumulistis I Pumping Station | |
| 1-unit Variable Frequency Drive 10HP | 150,000.00 |
| H. Executive I Pumping Station | |
| 1-unit Submersible Pump 5HP | 80,000.00 |
| 1-unit Submersible Motor 5HP | 60,000.00 |
| 1-unit Control Panel 5HP | 50,000.00 |
| I. Lagundi Pumping Station | |
| 1-unit Submersible Pump 2HP | 30,600.00 |
| 1-unit Submersible Motor 2HP | 39,900.00 |
| 1-unit Control Panel 2HP | 20,500.00 |
| J. Ubanon Booster Pump | |
| 1-unit Submersible Pump 20HP | 160,000.00 |
| 1-unit Submersible Motor 20HP | 150,000.00 |
| 1-unit Variable Frequency Drive 20HP | 200,000.00 |
| 1-unit Control Panel | 100,000.00 |

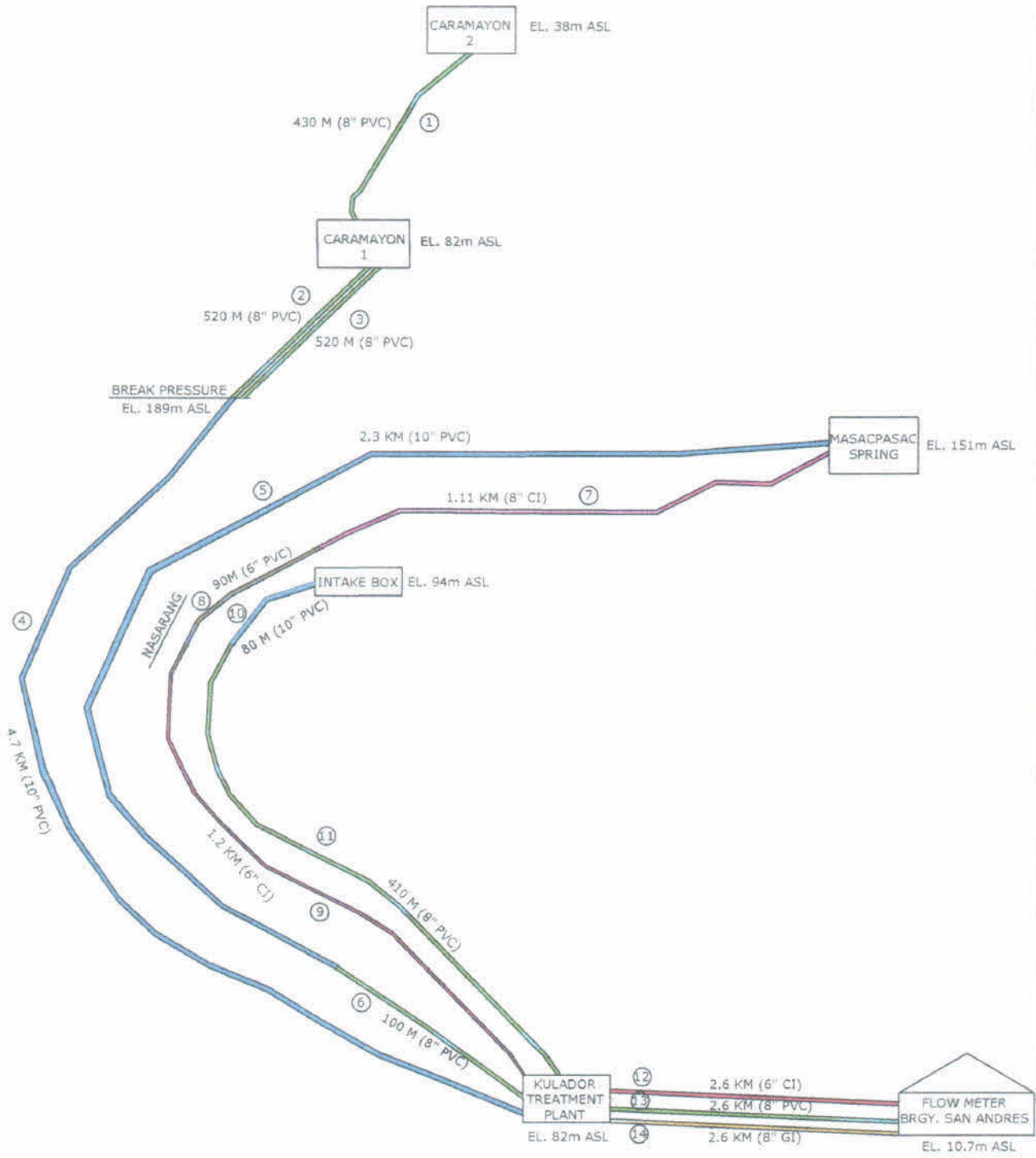
10605990-03 : Water Treatment Equipment

| | |
|--|------------|
| 1. Three (3) units Portable Turbidimeter @ P83,000.00/unit | 249,000.00 |
| 2. One (1) unit Ultrapen Pocket Tester | 12,500.00 |

50213050-99b : Repairs and Maintenance (M&E) - Pumping

| | |
|-----------------------------------|------------|
| Supply Labor & Material Repair of | 275,000.00 |
| a.) Submersible Pump | |
| b.) Vertical Pump | |

Annex F
Transmissions and Distribution Pipelines



CATBALOGAN WATER DISTRICT TRANSMISSION LINE

- LEGEND:**
- 8" Ø GI PIPE
 - 6" Ø CI PIPE
 - 6" Ø PVC PIPE
 - 8" Ø CI PIPE
 - 8" Ø PVC PIPE
 - 10" Ø PVC PIPE

Annex G
Operation's Manual



Catbalogan Water District

Operations Manual

Revision No 2.0 Dated MARCH 2021

Document File name: Catbalogan OM Revision 2.0 MARCH 2021.docx

Revision Sheet

| Release | Date | Revision Description |
|---------|------------|----------------------------|
| Rev. 00 | 12/18/2015 | Operations Manual produced |
| Rev. 01 | 08/30/2016 | Operations Manual revised |
| Rev. 02 | 03/15/2021 | Operations Manual revised |
| | | |
| | | |
| | | |
| | | |

OPERATIONS MANUAL

TABLE OF CONTENTS

| | | |
|----------|---|----------|
| 1 | GENERAL INFORMATION | 1 |
| 1.1 | Introduction on the Manual | 1 |
| 1.2 | Definition of Terms and Abbreviations | 1 |
| 1.3 | General Information about the Agency and the Selected Area of Operations | 1 |
| 2 | SYSTEM DESCRIPTION | 2 |
| 2.1 | General information on the Supplier | 2 |
| 2.1.1 | Area of Coverage | 2 |
| 2.1.2 | Household Coverage | 3 |
| 2.1.3 | Transmission and Distribution Pipelines | 3 |
| 2.1.4 | WSC Classification and Tariff Charges | 5 |
| 2.2 | Source of water: Catchment and extraction from source | 6 |
| 2.2.1 | Kulador Treatment Facility | 6 |
| 2.2.2 | Caramayon I Pumping Station (Spring) | 6 |
| 2.2.3 | Caramayon II Pumping Station (Spring) | 7 |
| 2.2.4 | Masacpasac (Spring) | 7 |
| 2.2.5 | Tumalistis Pumping Station (Deep Well) | 7 |
| 2.2.6 | Executive Pumping Station (Deep Well) | 7 |
| 2.2.7 | V&G Booster Pump | 7 |
| 2.2.8 | Canlapwas in-line Booster Pump | 8 |
| 2.2.9 | Mabini in-line Booster Pump | 8 |
| 2.2.10 | 440 Cu.m. Concrete Reservoir | 8 |
| 2.2.11 | Cogao Booster Pump | 8 |
| 2.2.12 | Antiao Booster Pump | 8 |
| 2.2.13 | Lagundi Pumping Station | 8 |
| 2.2.14 | Payao Pumping Station | 8 |
| 2.3 | Flow diagram | 10 |
| 2.4 | Treatment processes | 11 |
| 2.5 | Distribution system | 12 |
| 2.6 | Water quality required | 12 |
| 2.6.1 | Bacteriological Test | 12 |
| 2.6.2 | Laboratory Test | 13 |

| | | |
|-------------|---|-----------|
| 2.6.3 | Physico-Chemical Test..... | 13 |
| 2.7 | Delivery Point, Intended users of water and intended uses of the water..... | 14 |
| 3 | SYSTEM OPERATIONS OVERVIEW..... | 15 |
| 3.1 | Organization and Responsibilities..... | 15 |
| 3.1.1 | Board of Directors..... | 15 |
| 3.1.2 | General Manager..... | 15 |
| 3.1.3 | Division Manager..... | 15 |
| 3.2 | Operational Control and Supervision..... | 16 |
| 3.2.1 | Administrative Division..... | 16 |
| 3.2.2 | Commercial Division..... | 16 |
| 3.2.3 | Engineering Division..... | 17 |
| 3.3 | Operating Procedures..... | 18 |
| 3.3.1 | Production..... | 18 |
| 3.3.1.1 | Water Source and Treatment Process..... | 18 |
| 3.3.1.1.1 | Caramayon Spring Source (Pumping Station)..... | 18 |
| 3.3.1.2 | Bacteriological and Laboratory Testing..... | 18 |
| 3.3.1.2.1 | BACTERIOLOGICAL TEST (Monthly – LWUA compliance)..... | 19 |
| 3.3.1.2.2 | BACTERIOLOGICAL TEST (Monday & Wednesday – For Water Quality Monitoring/Detection of Coliform Organisms)..... | 19 |
| 3.3.1.2.3 | LABORATORY TEST (Monday to Sunday) (20-sampling points)..... | 20 |
| 3.3.1.2.4 | PHYSICAL-CHEMICAL TEST (Once a Year – LWUA compliance)..... | 22 |
| 3.3.1.2.4.1 | Caramayon Spring Source (Pumping Station)..... | 22 |
| 3.3.1.2.4.2 | Masacpasac Spring..... | 23 |
| 3.3.1.2.4.3 | Kulador Surface Water (Pesticides as additional Parameter)..... | 23 |
| 3.3.1.2.4.4 | Clarifier System..... | 24 |
| 3.3.1.2.4.5 | Executive (Pumping Station) Water Sampling/Testing & Reporting:..... | 25 |
| 3.3.1.2.4.6 | Tumalistis (Pumping Station) Water Sampling/Testing & Reporting:..... | 26 |
| 3.3.1.2.4.7 | Lagundi (Pumping Station) Water Sampling/Testing & Reporting:..... | 27 |
| 3.3.1.2.4.8 | Payao (Pumping Station) Water Sampling/Testing & Reporting:..... | 28 |
| 3.3.1.3 | NRW reduction..... | 29 |
| 3.3.1.3.1 | Leak Detection..... | 29 |
| 3.3.1.3.2 | District Metering Zone..... | 29 |
| 3.3.1.3.3 | Database and Geo-tagging in GIS Maps..... | 29 |
| 3.3.2 | COMMERCIAL..... | 29 |

| | | |
|-----------|--|----|
| 3.3.2.1 | Service Connection Application..... | 29 |
| 3.3.2.1.1 | Application Process..... | 29 |
| 3.3.2.1.2 | Investigation for proper classification | 29 |
| 3.3.2.1.3 | Survey for proper costing and pipe size identification..... | 29 |
| 3.3.2.1.4 | Recording New Customer Information in Database and GIS..... | 29 |
| 3.3.2.2 | Customer Complaints and request..... | 29 |
| 3.3.2.2.1 | Filing complaints and request..... | 29 |
| 3.3.2.2.2 | Job/Maintenance order preparation and monitoring..... | 29 |
| 3.3.2.2.3 | Monthly generation of complaints summary report | 30 |
| 3.3.2.3 | Billing and Collection..... | 30 |
| 3.3.2.3.1 | Meter Reading and Billing..... | 30 |
| 3.3.2.3.2 | Billing Report Generation | 30 |
| 3.3.2.3.3 | Customer Payment of Bills | 31 |
| 3.3.2.3.4 | Penalty and Disconnection Orders | 31 |
| 3.3.2.4 | Job Order Preparation and Accomplishment..... | 31 |
| 3.3.2.5 | Dealing with Delinquent Accounts | 31 |
| 3.3.2.6 | Cashiering | 31 |
| 3.3.2.6.1 | Check Preparation | 31 |
| 3.3.2.6.2 | Cash Security | 32 |
| 3.3.2.6.3 | Cash Position Report Preparation | 32 |
| 3.3.2.7 | Other Services offered..... | 32 |
| 3.3.2.7.1 | Reconnection | 32 |
| 3.3.2.7.2 | Disconnection | 32 |
| 3.3.2.7.3 | Change Meter..... | 32 |
| 3.3.2.7.4 | Recalibration..... | 32 |
| 3.3.2.7.5 | Change Registration..... | 33 |
| 3.3.2.7.6 | Service Request..... | 33 |
| 3.3.2.7.7 | Customer Report Generation..... | 33 |
| 3.3.3 | ADMINISTRATIVE..... | 33 |
| 3.3.3.1 | Human Resource | 33 |
| 3.3.3.1.1 | Time and Attendance / Reporting to Office..... | 33 |
| 3.3.3.1.2 | Leave Card Updating and Reporting..... | 34 |
| 3.3.3.1.3 | Filing of Leaves and Compensatory Time-Off (CTO) Filing of Leave:.... | 34 |
| 3.3.3.1.4 | 201 Filing and E-filing..... | 35 |
| 3.3.3.1.5 | Request for Personal Data Sheet (PDS), Service Records, and Leave Cards/COC | 36 |
| 3.3.3.1.6 | Report Generation..... | 36 |

| | |
|--|----|
| 3.3.3.1.7 Rating of Performance Targets: Division Performance Commitment Review / Individual Performance Commitment | 36 |
| 3.3.3.2 Stock and Supplies Inventory..... | 36 |
| 3.3.3.2.1 Purchasing and Stocking of Supplies and Equipment | 37 |
| 3.3.3.2.2 Issuance of Stocks and Supplies..... | 37 |
| 3.3.3.2.3 Generation of Inventory Reports..... | 37 |
| 3.3.3.2.4 Updating Meter History Card..... | 37 |
| 3.3.4 FINANCE | 37 |
| 3.3.4.1 Financial Reports Preparation | 37 |
| 3.3.4.1.1 Preparation of Billing Journal | 37 |
| 3.3.4.1.2 Preparation of Cash Receipt Journal | 37 |
| 3.3.4.1.3 Preparation of Disbursement Voucher | 38 |
| 3.3.4.1.4 Preparation of Journal Vouchers | 38 |
| 3.3.4.1.5 Preparation of Financial Statements | 38 |
| 3.3.4.1.6 Balancing of A/R in accounting and commercial..... | 38 |
| 3.3.4.1.7 Preparation of Monthly Data Sheet | 38 |

1 GENERAL INFORMATION

1.1 Introduction on the Manual

Welcome to the Operations manual of Catbalogan Water District. The purpose of this manual is to provide all employees and stakeholders of Catbalogan Water District with a reference manual containing policies and procedures established by the Board of Directors, General Manager, and Division Heads. In the interest of brevity, an attempt has been made to include only that information which will be used under normal operating circumstances within the district. For special situations, it is recommended that the appropriate division be contacted. This manual defines the different role and responsibilities within the organization, the operational control and supervision, and the different operating procedures of the major activities of the district.

The Catbalogan Water District Operations Manual is available on the district's official website at: www.catbaloganwd.gov.ph. Copies of the printed version are maintained at the frontdesk of CWD office located in Pier II, Allen Avenue Extension, Brgy 4, Catbalogan City.

1.2 Definition of Terms and Abbreviations

| | | |
|------|---|-------------------------------------|
| CWD | - | Catbalogan Water District |
| BOD | - | Board of Directors |
| GM | - | General Manager |
| NWSC | - | New Water Service Connections |
| NRW | - | Non Revenue Water |
| OR | - | Official Receipts |
| JO | - | Job Order |
| RIS | - | Requisition Issuance Slip |
| SSIS | - | Stock and Supplies Inventory System |

1.3 General Information about the Agency and the Selected Area of Operations

Catbalogan Water District (CWD) is the sole water provider of the city of Catbalogan. It was initially constructed in 1925 under the management of the local government. It was transferred to the National Waterworks and Sewerage Authority (NAWASA) upon its creation in 1955. In 1969, NAWASA was abolished and the Catbalogan municipal government took over the CWD management.

A Sangguniang Bayan resolution No. 66 was approved in July 5, 1978 creating the Catbalogan Water District (CWD) based on the national policy, the P.D. 198 known as Provincial Water Utilities Act of 1973 favoring local operation and control of water systems; authorizing the formation of local water districts and providing for the government and administration of such districts; chartering a national administration for facilitate improvement of local water utilities; granting said administration such powers as are necessary to optimize public service from water utility operations, and for other purposes. On December 7, 1979 the Local Water Utilities Administration awarded Conditional Certificate of Conformance No. 107 to the CWD.

The Catbalogan water supply is supplied from five waters sources, namely: a) Masacpasac sub-surface channel; b) Caramayon spring water; c) surface water at Kulador; d) deep well

at Tumalistas; and e) deep well at Piczonville Subdivision. These five sources currently serve twenty two (22) barangays, mostly from the Poblacion area.

2 SYSTEM DESCRIPTION

2.1 General information on the Supplier

The water supply of the City of Catbalogan is handled and managed by the Catbalogan Water District (CWD), which was initially constructed in 1925 under the management of the local government. It was transferred to the National Waterworks and Sewerage Authority (NAWASA) upon its creation in 1995. In 1969, NAWASA was abolished and the Catbalogan municipal government took over the CWD management.

A Sangguniang Bayan resolution No. 66 was approved in July 5, 1978 creating the Catbalogan Water District (CWD) based on the national policy, the P.D. 198 known as Provincial Water Utilities Act of 1973 favoring local operation and control of water systems; authorizing the formation of local water districts and providing for the government and administration of such districts; chartering a national administration for facilitate improvement of local water utilities; granting said administration such powers as are necessary to optimize public service from water utility operations, and for other purposes. On December 7, 1979 the Local Water Utilities Administration awarded Conditional Certificate of Conformance No. 107 to the CWD.

Currently, Catbalogan Water District is the only water service provider in the city of Catbalogan. Catbalogan Water District is a none-profit oriented and receives no subsidy from the national and local government. The revenue raised is solely from the concessionaires' monthly payments of water bills and other installation costs. Local Water District was declared a Government Owned Controlled Corporation by Supreme Court as of 1992.

The district is currently managed by its General Manager, Engr. Ralph S. Uy. It has three divisions namely: Administrative Division headed by Eusebia Christina Yboa (Division Manager), Commercial Division headed by Jessamine Q. Costo (Officer-in-Charge), and Engineering Division headed by Engr. Miguel P. Macaspag (Division Manager).

The policy making body is composed of five directors representing different sectors. The Chairman is Mrs. Myra Gay M. Tambor (Women Sector), Vice Chairman is Mr. Jose A. Mabulay Jr. (Civic Sector), Secretary/Treasurer is Mr. Pedrito G. Padilla (Education Sector), Rolando T. Ko (Business Sector), and Mr. Vincent C. Navarrete (Professional Sector).

2.1.1 Area of Coverage

Catbalogan is composed of 57 barangays with 22 barangays classified as upland or island barangays, the remaining 35 barangays are along the carline.

The current service area of CWD is only 45.61% of the total number of barangays or 26 out of 57 barangays. These barangays are Poblacion 1 to 13, San Andres, Canlapwas, San Pablo, Muñoz, Mercedes, Maulong, Guindapunan, Guinsorongan, and Bunu-anan which are Level III; and Darahuway Guti, Darahuway Dako, Payao (Government Facilities), Lagundi are Level I.

Possible expansions of the service coverage are the carline barangays along the highway, namely, San Vicente, Mahayag, Iguid, Silanga, Pupua, Payao, upper portion of Maulong, Lagundi, and Socorro.

2.1.2 Household Coverage

CWD is serving 60% of the total Number of households in the current service area and is projected to increase by 15% by the end of year 2025. (Based on the 2005 Census with estimated 10% increase per year)

2.1.3 Transmission and Distribution Pipelines

There are four transmission pipelines originating from the three water sources namely, one from Kulador, two from Masacpasac Spring and another one from Caramayon Spring. However, only two 200mm transmission pipelines that is in place from San Andres to the Poblacion proper.

The existing transmission lines have a carrying capacity of about 90-120 lps. This was based on the hydraulic analysis of the two 200mm transmission pipelines and actual recorded production.

Transmission and Distribution Pipelines.

| Pipeline ID No. | Pipe Size (diameter) | Pipe Type | Pipe Length (linear meter) | Year Installed | Location |
|--|----------------------|-----------|----------------------------|----------------|---|
| Transmission Pipeline (Caramayon – Masacpasac – Kulador – San Andres) | | | | | |
| 1 | 8"Ø (200mm) | PVC | 430 | 2016 | Caramayon II – Caramayon I |
| 2 | 8"Ø | PVC | 520 | 2016 | Caramayon I – Break Pressure |
| 3 | 8"Ø | PVC | 520 | 2016 | Caramayon I – Break Pressure |
| 4 | 10"Ø (250m) | PVC | 4,700 | 2004 | Break Pressure – Kulador Treatment Plant |
| 5 | 10"Ø | PVC | 2,300 | 2010 | Masacpasac Spring – Nasarang |
| 6 | 8"Ø | PVC | 100 | 2010 | Nasarang – Kulador Treatment Plant |
| 7 | 8"Ø | CI | 1,110 | 1957 | Masacpasac Spring – Nasarang |
| 8 | 6"Ø (150mm) | CI | 90 | 1957 | Nsarang |
| 9 | 6"Ø | CI | 1,200 | 1957 | Nasarang – Kulador Treatment Plant |
| 10 | 10"Ø | PVC | 80 | 2006 | Intake Box – Nasarang |
| 11 | 8"Ø | PVC | 410 | 2010 | Nasarang – Kulador Treatment Plant |
| 12 | 6"Ø | CI | 2,600 | 1957 | Kulador Treatment Plant – San Andres FM |
| 13 | 8"Ø | PVC | 2,600 | 2010 | Kulador Treatment Plant – San Andres FM |
| 14 | 8"Ø | GI | 2,600 | 1990 | Kulador Treatment Plant – San Andres FM |
| TOTAL-1 | | | 19,260 | | |
| Transmission Pipeline (San Andres to Poblacion) | | | | | |
| 15 | 8"Ø | | 2,523 | 2006 | San Andres FM – Rizal Ave. Ext. (Tennis Court) |
| 16 | 8"Ø | PVC | 512 | 2012 | Rizal Ave. Ext. (Tennis Court) – Del Rosario St. |
| 18 | 8"Ø | GI | 300 | 1987 | San Andres FM – San Andres Basketball Court |
| 18 | 8"Ø | PVC | 2,009 | 1987 | San Andres Basketball Court – 6 th St. |
| TOTAL-2 | | | 5,344 | | |
| TOTAL (TRANSMISSION) | | | 24,604 | | |
| Distribution Pipeline (Poblacion Area) | | | | | |
| 19 | 6"Ø | PVC | 696 | 1987 | Purok 5 - Mabini Ave. - 6 th St. - Molave St. |
| 20 | 6"Ø | PVC | 852 | 2018 | Diversion Road (Junction) – Doctor's Hospital |
| 21 | 6"Ø | PVC | 402 | 2019 | Diversion Road (Junction) – Doctor's Hospital |
| 22 | 6"Ø | PVC | 90 | 2006 | 7 th St. (FH) – Brgy. 13 Concrete Reservoir |
| 23 | 6"Ø | PVC | 832 | 2010 | Legaspi Ave. – Executive Heights Subdivision (Entrance) |
| 24 | 4"Ø (100mm) | PVC | 716 | | Purok 5 – Purok 4 – Mabini Ave. |
| 25 | 4"Ø | PVC | 96 | | 6 th St. – 5 th St. |
| 26 | 4"Ø | PVC | 559 | 2008 | Mabini Ave. – 5 th St. – McKinley Ave. – Del Rosario St. |
| 27 | 4"Ø | PVC | 145 | | San Francisco St. – Burgos Ave. |
| 28 | 4"Ø | PVC | 150 | 2019 | Callejon St. (Salug) – Burgos Ave. |

| | | | | | |
|---|------------|-----|-----------------------------|------|--|
| 29 | 4"Ø | PVC | 196 | | Corner Molave St. – Corner San Francisco St. (Along Mabini Ave.) |
| 30 | 4"Ø | PVC | 502 | 1987 | 7 th St. (Alegro Hotel) – LTO – Rizal Ave. Ext. – San Roque St. (City Hall) |
| 31 | 4"Ø | PVC | 122 | | San Roque St. (City Hall) – San Francisco St. (City Plaza) |
| 32 | 4"Ø | PVC | 144 | 1987 | Corner San Francisco St. – Corner Del Rosario St. (Along Rizal Ave.) |
| 33 | 4"Ø | PVC | 204 | 2006 | Tennis Court – Samar Provincial Hospital |
| 34 | 4"Ø | PVC | 136 | | Samar Provincial Hospital – Himyangan |
| 35 | 4"Ø | PVC | 123 | 2006 | Himyangan – San Roque St. |
| 36 | 4"Ø | PVC | 796 | | Executive Heights Subdivision (Entrance) – Milagros St. (Guinsorongan) |
| 37 | 4"Ø | PVC | 485 | | Sto. Niño St. (Guinsorongan) – Piczonville PS |
| 38 | 4"Ø | PVC | 312 | | Corner Legaspi Ave. – Corner Curry Ave. (Along Del Rosario St.) |
| 39 | 4"Ø | PVC | 188 | 1987 | Corner Curry Ave. – Corner Allen Ave. (Along Del Rosario St.) |
| 40 | 4"Ø | PVC | 449 | 1987 | Corner Allen Ave. – Old Antiao Bridge (Along Del Rosario St.) |
| 41 | 4"Ø | PVC | 3,117 | | Old Antiao Bridge – Brgy. Hall (Maulong) |
| 42 | 4"Ø | PVC | 158 | | V&G PS – V&G Subdivision |
| 43 | 4"Ø | PVC | 6 | | Cogao Pumping Station |
| 44 | 3"Ø (63mm) | PVC | 185 | | Bliss (Entrance) – Bliss Chapel |
| 45 | 3"Ø | PVC | 669 | | Purok 5 (Canlapwas) – Corner McKinley Ave. |
| 46 | 3"Ø | PVC | 83 | | Corner Azucena St. – 5 th St. (Brgy. Hall – Muñoz) |
| 47 | 3"Ø | PVC | 127 | | Corner 7 th St. – Old Public Market (Allen Ave. Ext.) |
| 48 | 3"Ø | PVC | 360 | 2010 | Corner 5 th St. – San Bartolome St. (Along Mabini Ave.) |
| 49 | 3"Ø | PVC | 68 | 1987 | Corner San Bartolome St. – Del Rosario St. (Pieta Park) |
| 50 | 3"Ø | PVC | 153 | 1987 | Corner Mabini Ave. – Corner McKinley Ave. (Along San Francisco St.) |
| 51 | 3"Ø | PVC | 124 | | Corner Mabini Ave. (Tia Anita's) – Corner Allen Ave. (Mang Inasal) (Along San Roque St.) |
| 52 | 3"Ø | PVC | 309 | | Corner Mabini Ave. – Corner Curry Ave. (Along San Francisco St.) |
| 53 | 3"Ø | PVC | 925 | | Corner Curry Ave. – Guindapunan (Along San Roque St.) |
| 54 | 3"Ø | PVC | 184 | 184 | Samar Provincial Hospital – DPWH |
| 55 | 3"Ø | PVC | 372 | 2011 | SSU Guindapunan Campus |
| 56 | 3"Ø | PVC | 325 | | Corner Legaspi Ave. – Corner Curry Ave. (Along San Francisco St.) |
| 57 | 3"Ø | PVC | 309 | 1987 | Corner Curry Ave. – Corner Mabini Ave. (Along San Francisco St.) |
| 58 | 3"Ø | PVC | 474 | | Corner Legaspi Ave. – Corner Curry Ave. (Along San Bartolome St.) |
| 59 | 3"Ø | PVC | 316 | 1987 | Corner Curry Ave. – Corner MABini Ave. (Along San Bartolome St.) |
| 60 | 3"Ø | PVC | 148 | | Lincoln Ave. |
| 61 | 3"Ø | PVC | 143 | | Taft Ave. |
| 62 | 3"Ø | PVC | 628 | | Corner San Roque St. – CWD (Along Allen Ave.) |
| 63 | 3"Ø | PVC | 622 | 1987 | Pier 2 – Mang Inasal (Along Allen Ave.) |
| 64 | 3"Ø | PVC | 120 | | Callejon St. (Brgy. 4) |
| 65 | 3"Ø | PVC | 94 | | Corner Sta. Cruz St. – Sto. Niño St. (Guinsorongan) |
| 66 | 3"Ø | PVC | 822 | | Corner Milagros St. – Bonoanan E/S |
| 67 | 3"Ø | PVC | 544 | | Camp Lukban Entrance (Gate 1) – DTU Building |
| 68 | 3"Ø | PVC | 651 | | Maulong Brgy. Hall – Dead End (Distribution Line) |
| 69 | 3"Ø | PVC | 253 | | Road Crossing – Sifio Igot |
| 70 | 3"Ø | PVC | 177 | | Allen Ave. – Curry Ave. (Along Pier 1 & Pier 2) |
| 71 | 3"Ø | PVC | 25 | | Allen Ave. – CWD Compound |
| 72 | 3"Ø | PVC | 26 | | CWD Gate – Sulod St. (Allen Ave. Ext.) |
| 73 | 3"Ø | PE | 317 | | Esmeralda St. – McKinley Ave. (Along 5 th St.) |
| TOTAL (TRANSMISSION) | | | 21,028 | | |
| TOTAL (TRANSMISSION/DISTRIBUTION LINE) | | | 45,632- linear meter | | |
| | | | (45.632-kilometers) | | |

2.1.4 WSC Classification and Tariff Charges

Customers of CWD are classified into five types, namely, Residential/Government, Commercial/Industrial, Commercial A, Commercial B, Commercial C and Bulk/Wholesale.

The current water rate was implemented last March 2018 with a minimum charge equivalent to 10-cubic meter consumption. Below is the current water rate of Catbalogan Water District (CWD) with a corresponding increase of charges based on the actual consumption, classification and size of water meter used or installed.

| Classification | Size of WM | Minimum Charge | Commodity Charge | | | |
|------------------------|------------|----------------|------------------|-------------|-------------|---------------|
| | | 10-cu.m. | 11-20 cu.m. | 21-30 cu.m. | 31-40 cu.m. | 40 cu.m. & up |
| Residential/Government | ½" | ₱ 200.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | ¾" | ₱ 320.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | 1" | ₱ 640.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | 1-1/2" | ₱ 1,600.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | 2" | ₱ 4,000.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| | 3" | ₱ 7,200.00 | ₱ 22.15 | ₱ 24.30 | ₱ 28.25 | ₱ 32.45 |
| Commercial/Industrial | ½" | ₱ 400.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| | ¾" | ₱ 640.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| | 1" | ₱ 1,280.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| | 1-1/2" | ₱ 3,200.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| | 2" | ₱ 8,000.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| | 3" | ₱14,400.00 | ₱ 44.30 | ₱ 48.60 | ₱ 56.50 | ₱ 64.90 |
| Commercial A | ½" | ₱ 350.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| | ¾" | ₱ 560.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| | 1" | ₱ 1,120.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| | 1-1/2" | ₱ 2,800.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| | 2" | ₱ 7,000.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| | 3" | ₱12,600.00 | ₱ 37.00 | ₱ 42.50 | ₱ 49.40 | ₱ 56.75 |
| Commercial B | ½" | ₱ 300.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| | ¾" | ₱ 480.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| | 1" | ₱ 960.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| | 1-1/2" | ₱ 2,400.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| | 2" | ₱ 6,000.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| | 3" | ₱10,800.00 | ₱ 31.70 | ₱ 36.45 | ₱ 42.35 | ₱ 48.65 |
| Commercial C | ½" | ₱ 250.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| | ¾" | ₱ 480.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| | 1" | ₱ 800.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| | 1-1/2" | ₱ 2,000.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| | 2" | ₱ 5,000.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| | 3" | ₱ 9,000.00 | ₱ 26.40 | ₱ 30.35 | ₱ 35.30 | ₱ 40.55 |
| Bulk/Whole Sale | ½" | ₱ 600.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | ¾" | ₱ 960.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 1" | ₱ 1,920.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 1-1/2" | ₱ 4,800.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 2" | ₱12,000.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 3" | ₱21,600.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |
| | 4" | ₱42,300.00 | ₱ 66.45 | ₱ 72.90 | ₱ 84.75 | ₱ 97.35 |

2.2 Source of water: Catchment and extraction from source

The District currently has four (4) main water sources, namely Kulador (Surface), Caramayon I, Caramayon II, and Masacpasac (Spring), with two supplemental water sources namely; Tumulistis and Executive Deep Wells. There are also two satellite water sources, namely; Payao and Lagundi Deep Wells.

2.2.1 Kulador Treatment Facility

The plant is located 2.7 kilometers from Barangay San Andres of Catbalogan, Samar, or 110 48' 44.4" N and 240 54' 10.3" E.

The treatment plant receives water from the Antiao River through an Intake Box 3m x 3m wide and 2.5m depth. The water was conveyed through a telescopic Transmission Line of 250mm and 200mm diameter PVC pipes and goes into a 4,000cum/day clarifier system for water treatment. Later this year the clarifier is to expand its capacity to 6,000cum/day.

2.2.2 Caramayon I Pumping Station (Spring)

The project started on February 22, 2002. Fund by 32M ADB – Loan under LWUA's Small Towns Water Supply System Project (STWSSP). Component of the project are the ff:

- Construction of impounding Dam and Sump Tank
- Pumping facilities 1-100hp, 2-500hp, 440v, 3 diameter
- Generator, 300hp
- Laying of 5.1km 10"diameter Transmission Lines, 500lm riser pipe, 200mm diameter
- Installation of 3-phase Electric Power Line, 13.2 KV primary lines

The Project site is not accessible to any mode of transportation. The spring is located in a highland Barangay of Lobo, Sitio Caramayon, it is approximately 9.1 kms. from the nearest lowland Barangay San Andres and about 11 kms. from the center of the Poblacion. Caramayon spring could be reached only by foot passing through mountains, the highest elevation of which is 197 meters above mean sea level and traversing the same river about twenty (20) times. The said spring source is below and between mountain ranges with an elevation of 84.7 meters.

Except for the pumps which were airlifted (courtesy of the 8ID, Camp Lucban & PAF) all of the materials and equipment were handled/ carried manually.

Caramayon spring source capacity is 140 lps. A Mini impounding Dam was built from where water flows to the sump Tank by gravity. Three high head submersible pumps, 1-100hp, 2-50 hp was installed to pump the water to the break pressure chamber and from there water flows by gravity to the Kulador Treatment Plant via a 10-inch pipeline through a 4.65-km distance.

A 3-phase power line 13.2 KV Primary Line with a distance of 11.9 kms. was constructed as a primary prime mover of the pumping equipment. A generator was installed as standby power.

5.1 kms pipelines 10 inch and 8 inch diameter were installed. On February 22, 2005, test run was conducted on the pumping equipment and three days after it was put to operation

With the three (3) pumps capable of delivering a combined capacity of 91 lps, it can supply 9000 households.

2.2.3 Caramayon II Pumping Station (Spring)

The project started first quarter of 2018, and was operational December 2019. The diversion point of the project is N11°50'39.5" E124°54'37.4". Component of the project are the following:

- Pumping Facilities: 125hp (Pump & Motor and Variable Frequency Drive), Sump Tank (size: width=3.175m, length=4.175m, height=4.175m) and Pump House
- 3-units Transformer 50KVA
- 8" diameter PVC Transmission Lines

The Project site is located in highland barangay of Lobo and is not accessible to any mode of transportation and approximately 500-linear meters from Caramayon I.

2.2.4 Masacpasac (Spring)

The Masacpasac spring is located at 11 48' 58.8000" N, 124 55' 10.8000" E and approximately 5 kms from Brgy San Andres.

The water source contributes an average of 64% of the total water production with two transmission lines, CI 6" and CI 10" with a total rated capacity of 55 lps.

The source is not passable by any vehicle and can only be reached by foot.

2.2.5 Tumalistis Pumping Station (Deep Well)

This is a deep well water source providing water in the southside part of Catbalogan. This has a total rated capacity of 4.5 lps utilizing a 10hp submersible pump.

Two hours operation is intended for the Executive heights subdivision. The remaining hours supplements the supply for the Poblacion.

2.2.6 Executive Pumping Station (Deep Well)

This is a deep well water source providing additional water supply to high-elevated area of Executive Heights Subdivision (Phase 2-A and Phase 2-B) operating 3-4 hours per day. This has a total rated capacity of 1.5 lps utilizing a 2hp submersible pump. The diversion point of project is N 11°45'53.4" E 124°53'18.2". The project component includes the following:

- 1-set of 2HP Submersible Pump and Motor
- 1-unit Chlorinator
- 100-lin.m. 2"Ø PE Pipeline
- Deep Well Data (Bore Hole = 8"Ø; Riser Pipe = 2"Ø GI @ 40.50 meter; Well Deep = 51m)
- And currently utilizing the 1-cu.m. Concrete Tank owned by the Subdivision.

2.2.7 V&G Booster Pump

V & G, 5hp booster pump - was donated by the developer to CWD, to cater the needs of V & G subdivision.

2.2.8 **Canlapwas in-line Booster Pump**

This station is equipped with 25hp, 220v, 3 phase, Floor mounted high pressure pump. It boosts water pressure to increase the water supply in Canlapwas, San Andres, Salug, Casantolan, Brgy. Mercedes, Brgy. Mabini.

2.2.9 **Mabini in-line Booster Pump**

Mabini in-line Booster pump – 40 hp, 220v, 3 phase, high head, submersible pump, boosting of water pressure to increase the area coverage supplied due to existing limited size of Distribution Line, serving Canlapwas, San Andres, Salug, Casantolan, Brgy. Mercedes, Brgy. Mabini.

2.2.10 **440 Cu.m. Concrete Reservoir**

This Reservoir was constructed by the Americans way back 1935. It was rehabilitated and re commissioned last 2005. It is located in an elevated part of Brgy. 13, with an elevation of 35m above sea level. It is used to augment the high demand during morning (peak hour) of the poblacion. The remaining 100cu.m. of water was reserved for fire fighting purposes.

2.2.11 **Cogao Booster Pump**

This Station was constructed last 2015 to provide water supply to two (2) island Barangays namely Darahuway Dako and Darahuway Guti. Transmission line is a 2" diameter x 1.7km underwater, it is equipped with a floor mounted high pressure, 75m TDH, 5lps, 200v, 3 diameter pump.

2.2.12 **Antiao Booster Pump**

This Station was constructed late 2018 to boost water supply to far-flung and high elevated areas of barangay Mercedes and Maulong. Distribution Line is 4"Ø PVC pipe with pumping facilities of 20HP Pump & Motor and VFD with control panel.

2.2.13 **Lagundi Pumping Station**

This Station (lot) is being utilized thru Contract of Usufruct thru SP Resolution No. 2020-089 by the City Government and the well/project was developed and constructed year 2017 and was operational January of 2018 to supply the water needs of the BJMP. Two (2) units of Automatic "Tubig" Machine (ATM) were installed in the pumping station and at barangay Hall to cater the needs of the residents of the barangay thru a Level I water supply system. The diversion point of the station is N 11°45'43.7" E 124°54'39.2". The project component includes the following:

- 1-set of 2HP Submersible Pump and Motor
- 1-unit Chlorinator
- 600-lin.m. 2"Ø PE Pipeline
- 2-units Stainless Tanks (2 cu.m. & 1-cu.m.)
- Deep Well Data (Bore Hole = 10"Ø; Casing = 8"Ø – 6"Ø PVC Pipe; Riser Pipe = 2"Ø GI Pipe @ 240'; Well Deep = 270')

2.2.14 **Payao Pumping Station**

This Station (lot) is being utilized thru Contract of Usufruct by the City Government and the well/project was developed and constructed year 2019 and was operational January of 2020 to supply the water needs of the Local Government Facilities (Relocation Site, COVID Facilities and other government offices. This has a total rated capacity of 1.5 lps utilizing a 2HP submersible pump. The diversion point of the station is N 11°48'8.1" E 124°52'2.2". The project component includes the following:

- 1-set of 2HP Submersible Pump and Motor
- 1-unit Chlorinator
- 3-meters 2"Ø GI Supply Pipe
- 2-units Stainless Tanks (2-cu.m.) owned by the City LGU
- Deep Well Data (Bore Hole = 8"Ø; Casing = 8"ØGI (Not fully cased); Riser Pipe = 1-1/2"Ø GI Pipe @ 22.50 meter; Well Deep = 31 meter)

2.3 Flow diagram

To accurately define the hazards in the water supply system, it is best to describe first the components of the system in detail. The diagram shows the flow of water from the source, to the treatment, and to distribution. In between are operational and inspection processes to ensure the quality of water

Figure 1.0: System Schematic Diagram

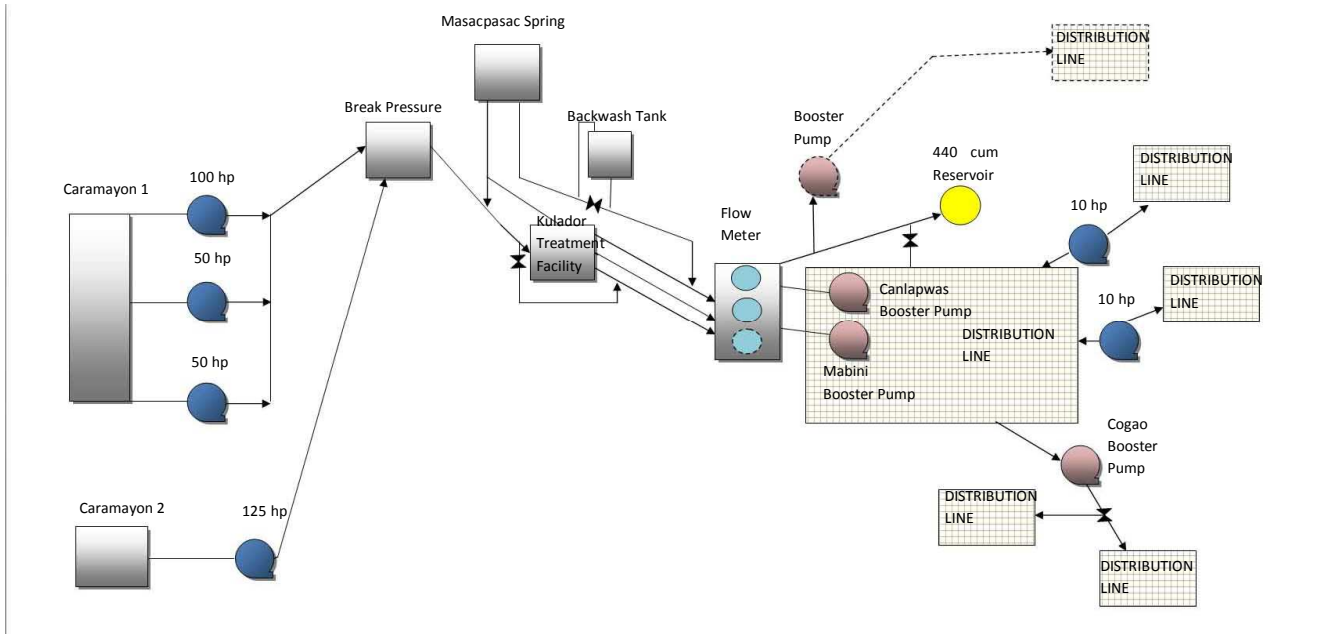
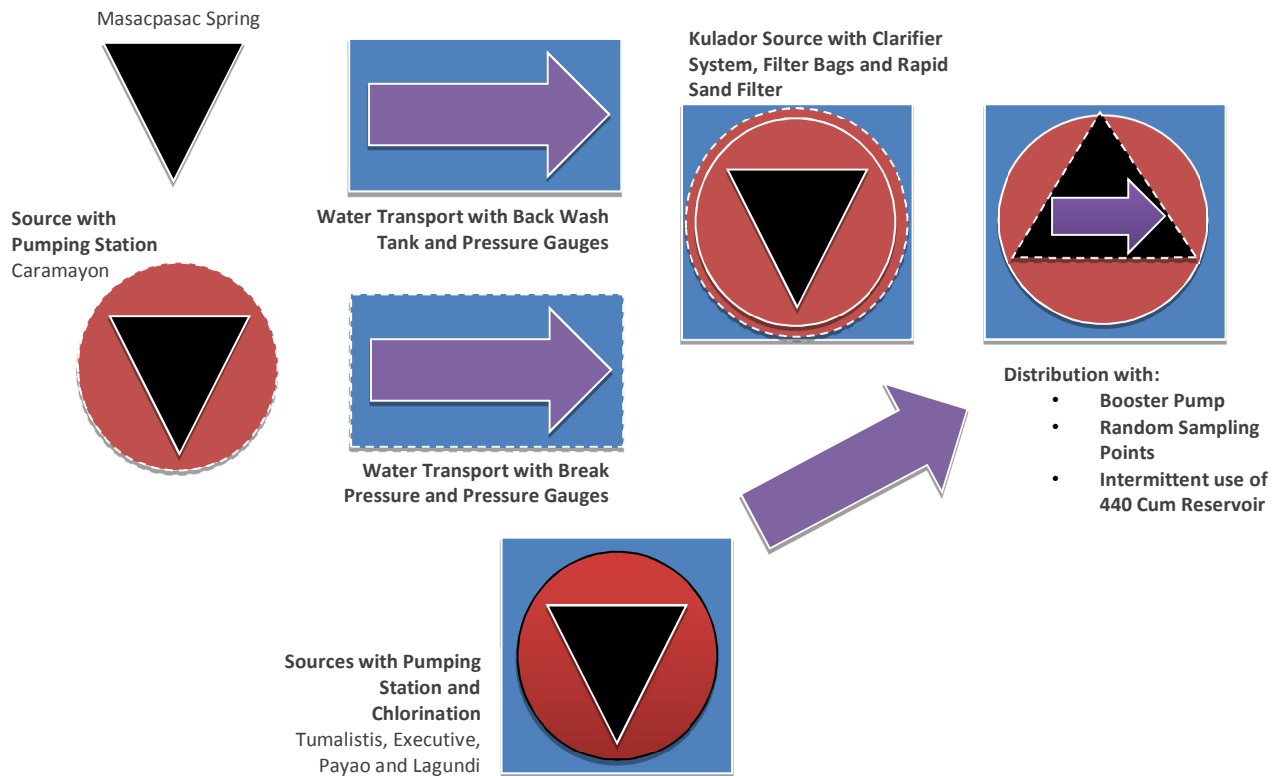
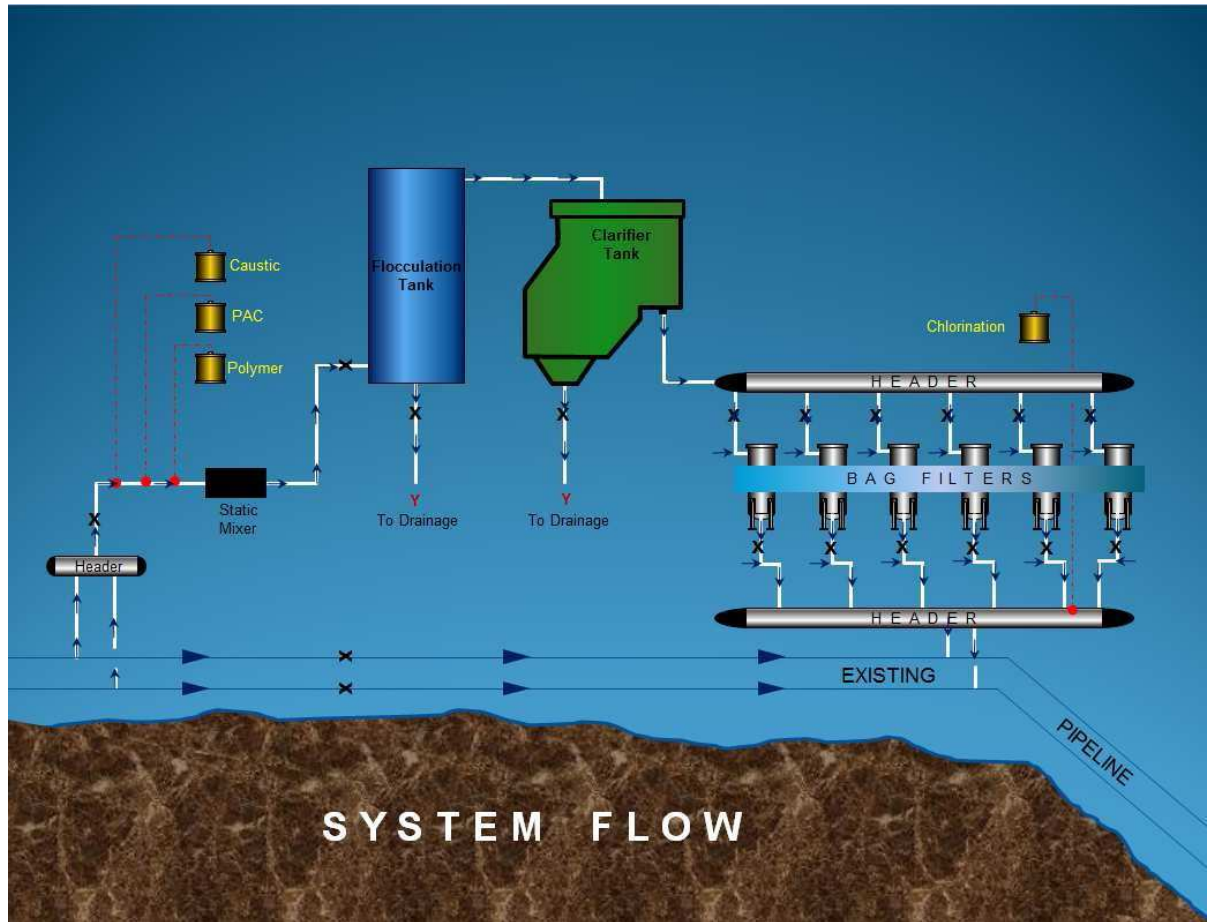


Figure 2.0: Process Flow Diagram



2.4 Treatment processes

Figure 3.0 Clarifier system flow



The treatment facility is located in Kulador, approximately 2.7 kms from the poblacion. The facility is equipped with a clarifier system which can process 4,000 CMD of turbid water. Turbid water that enters the system is injected with PAC and Polymer to capture sediments, it will then go to a fluctuation tank and clarifier to let the sediments settle down. Finish product will pass through bag filters for final process of filtration before chlorine is injected for disinfection.

2.5 Distribution system

Figure 4.0 Distribution Line

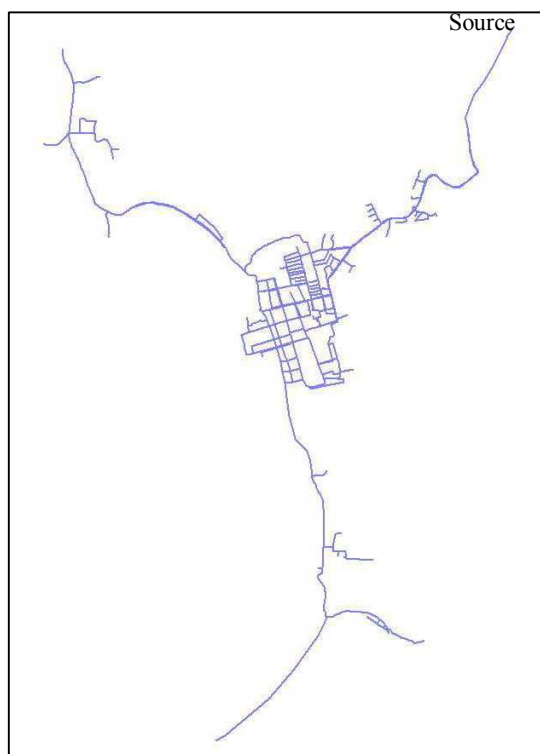
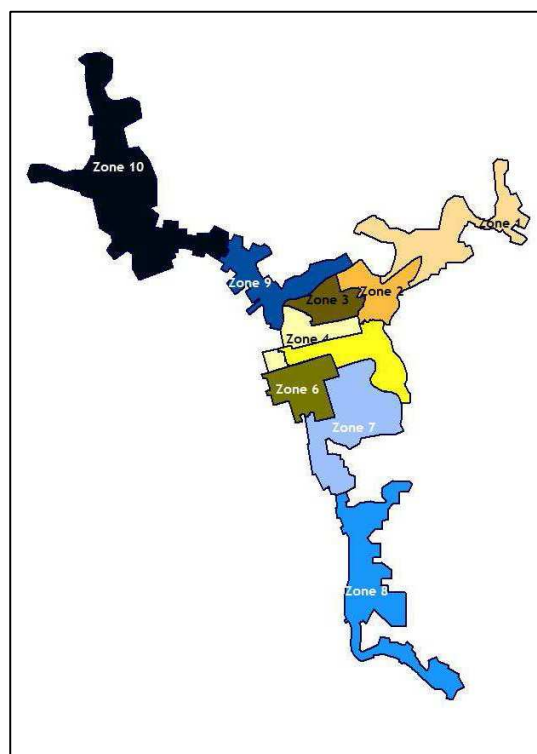


Figure 5.0 Zoning



The current distribution line is serving 26 barangays subdivided into 10 zones. Three (3) booster pumps (Canlapwas, Mabini & Old Antiao) are in placed within the poblacion to boost water pressure to far flung barangays/areas, and one booster pump at V&G to boost water pressure to the residents of the subdivision. Another booster pump was place in Cogao to boost water pressure to Brgy. Bunuanan and to supply the two island barangays of Darahuway Dako and Darahuway Guti with Level I water system.

As shown in figures 3 and 4, northern tip of zone 10 and southern tip of zone 8 covers the barangays that are farthest from the source. These are also the barangays that experience low to zero water pressure especially during peak hours.

The district distribution lines and facilities information are database in the existing Geographic Information System of the office.

In the later part of this plan, control measures and improvement plans will be discussed to answer the different hazards that the current distribution lines is having.

2.6 Water quality required

The district follows the standards set by the Administrative Order No 2007- Philippine National Standards for Drinking Water of 2007.

To ensure safe drinking water, the laboratory technician conducts the following:

2.6.1 Bacteriological Test

a. PHC Bottle

Tests are conducted every Monday and Wednesday using PHC bootle. Daily results are saved in a database where reports are generated and submitted to the City Health Office.

b. Microbiological Test

The test is conducted by a DOH accredited testing center in the region. Currently, Region VIII has two (2) accredited testing centers, the Eastern Visayas Regional Medical Center (EVRMC) and Primewater-Leyte Metro Water District. Various water samples are submitted to the accredited laboratory center every month for testing, and subsequently submitted to LWUA. Hereunder is the required minimum number of samples and its frequency.

| Population Served | Minimum Frequency of Sampling for Total Coliform and Thermotolerant Coliform/E.Coli | Minimum Frequency of Sampling for Heterotrophic Plate Count | Point of Compliance |
|--|---|---|---------------------|
| Less than 5,000 | 2 samples monthly | 2 samples monthly | Consumer's Tap |
| 5,000 – 100,000 | 1 sample per 5,000 population plus 2 additional samples monthly | 1 sample per 5,000 population plus 2 additional samples monthly | Consumer's Tap |
| More than 100,000 | 1 sample per 10,000 population plus 12 additional samples monthly | Required at least 40% of the sampling points | Consumer's Tap |
| Note: Collection of samples should be spread out within a month | | | |

2.6.2 Laboratory Test

Water sampling is conducted daily in random household points within the service area. The office is equipped with laboratory equipment to measure the following standards:

- a. Chlorine Residual - 0.3 - 1.5 ppm (mg/L)
- b. Salinity - 500 ppm s
- c. Conductivity - No Limit
- d. Ph - 6.5 - 8.5 mg/l
- e. Total Dissolved Solid - 600 mg/l
- f. Turbidity - 5.0 NTU

Laboratory test results are encoded to a database where reports are generated for submission to the City Health office.

2.6.3 Physico-Chemical Test

This test is conducted once a year by a DOH accredited testing center. The test measures, Aesthetic, Physical, and Chemical components of the water supplied. The table below shows the parameters being measured by the test.

| PARAMETERS | PNSDW Maximum Allowable Level | Sampling Location |
|----------------------------------|-------------------------------|--|
| I. Mandatory Parameters | | |
| 1.) Arsenic | 0.01 mg/L | Treatment Plant Outlet/Source |
| 2.) Cadmium | 0.003 mg/L | Customer's Tap |
| 3.) Lead | 0.01 mg/L | Customer's Tap |
| 4.) Nitrate | 50 mg/L | Treatment Plant Outlet/Source |
| 5.) Color – Apparent | 10 CU | Treatment Plant Outlet/Source/Customer's Tap |
| 6.) Turbidity | 5 NTU | Customer's Tap |
| 7.) Ph | 6.5 to 8.5 | Treatment Plant Outlet/Source/Customer's Tap |
| 8.) Total Dissolved Solids (TDS) | 600 mg/L | Treatment Plant Outlet/Source |
| 9.) Disinfection Residual | | |
| 9-1) Residual Chlorine | 0.30 to 1.5 mg/L | Treatment Plant Outlet/Source/Customer's Tap |

| | | |
|---------------------------|-------------------|---|
| 9-2) Chlorine Dioxide | 0.20 to 0.40 mg/L | Treatment Plant Outlet/Source/Customer's Tap |
| II. Additional Parameters | | |
| (Determined by LDWQMC) | | |

2.7 Delivery Point, Intended users of water and intended uses of the water

Catbalogan Water District is currently serving 9,229 customers within the City of Catbalogan. The farthest delivery point to the North is barangay Maulong, estimated to be 3-kms from Poblacion, while farthest to the Southern delivery point is barangay Bunuanan, about 2-kms away from the Poblacion.

Intended users of water are the population of the City of Catbalogan. Currently 26 barangays were being served, 22 of which have Level III and the remaining 4 have Level I water supply systems.

3 SYSTEM OPERATIONS OVERVIEW

3.1 Organization and Responsibilities

The water district is currently operating under the supervision of Local Water Utilities Authority (LWUA). It has a policy making body representing different sectors of the community. The organizational chart of the district is attached as Appendices 1.0

3.1.1 Board of Directors

The Board of Directors of a district is composed of five citizens of the Philippines who are of voting age and residents within the district. One member is a representative of civic-oriented service clubs, one member a representative of professional associations, one member a representative of business, commercial, or financial organizations, one member a representative of educational institutions, one member a representative of women's organizations. The district does not have any representative from the administration as sixth member.

| | |
|------------------------------|--|
| Women Organizations | - Dir. Myra Gay M. Tambor Chairperson |
| Civic-oriented service clubs | - Dir. Jose Mabulay Vice-Chairperson |
| Education Institutions | - Dir. Pedrito G. Padilla |
| Professional Associations | - Dir. Vincent C. Navarrete |
| Business Sector | - Dir. Rolando Ko |

3.1.2 General Manager

The duties of the General Manager and other officers shall be determined and specified from time to time by the Board. The current General Manager of the district is Engr. Ralph S. Uy. He has full supervision and control of the maintenance and operation of water district facilities, with power and authority to appoint all personnel of the district. Provided, that the appointment of personnel in the supervisory level shall be subject to approval by the Board.

3.1.3 Division Manager

There are three divisions supporting the office of the General Manager, namely: Administrative Division, Commercial Division, and Engineering Division.

The Administrative Division is managed by Ms. Eusebia Christina Yboa. She directs and supervises basic efforts of the division like general services, human resource management office, property section, information management, and planning and development.

The Commercial Division is managed by Mrs. Jessamine Q. Costo supervises the utility activities specifically on application for new water service connections, meter readings, billings and collections, marketing, investigations, disconnection, reconnections, maintaining customers records, and other related activities.

The Engineering Division being managed by Engr. Miguel Macaspag directs and supervises the engineering, production and construction activities of the district. He

coordinates efforts with other divisions and evaluates performance of the supervisors and employees under his division.

3.2 Operational Control and Supervision

3.2.1 Administrative Division

The Administrative division has five (5) sections namely: Human Resource Management Section, Property Management Section, General Services Section, Information Management Section, and Planning and Development Section.

The human resource management section generally falls into nine broad activities, namely: Organization Tasks, Resources for the organization, Performance management, Employee development, Reward Management, and Employee relations.

Property management section is the overall in charge in the acquisition of new properties and equipment, its utilization and the disposition of unserviceable or no longer needed equipment of the district.

The Information Management section develops implements and maintains Information Systems, Databases and Applications that support the processes of the district. The section also provides access to ICT resources; supports and maintains district's ICT facilities.

The current Planning Section has primary responsibility for the implementation of the Comprehensive Plan through the development review process. The Section coordinates the activities of the Engineering and Commercial Division, which provides recommendations on planning matters.

The General Services Management section is under the supervision of the division head maintains inventory of linen clothing and supplies; accepts delivery of and transports supplies; provides various services to the different division of the district.

3.2.2 Commercial Division

The division currently has two sections, the billing and collection section and the finance section.

The billing and collection section focuses on three major activities, meter reading and billing, Collection, preparation of job/maintenance orders, Disconnection of service connection, maintenance of customer records, investigation, and answering customer's complaints and queries.

The district currently has four (4) meter readers who conducts meter reading for the first ten days of the month. There are two (2) customers assistants. They handle the preparation of job/maintenance orders and answering customer complaints and queries. Three (3) customer's assistants are assigned in the maintenance of customer records and preparation of Billing. Two investigators are assigned to conduct surveys on the classification of new applicants and validating questionable consumption and connections. The division has one supervisor that directly supervises the billing and collection activities.

The Finance Section is an essential component to business operations. It cover a wide range from basic bookkeeping to providing information to assisting managers and board of directors in making strategic decisions.

Finance Section is responsible for all the day to day transaction for the business. This includes the following:

1. Accounts Payable (Disbursement) – It is responsible for management of the cash flow and ensuring there are enough funds available to meet the day to day payments. It also ensures that suppliers are paid on time.
2. Cash collections: All cash received and receivables from sales and from all other sources is identified and recorded.
3. Payroll – the accounting department ensures that the company pays its employees accurately and timely, including bonuses, commissions and benefits. In addition, proper tax and other employees remittances to pertinent government agencies is assessed and payments are on time.
4. Properties and Inventories - The accounting department keeps records of all purchases and issuances and making sure the inventories balances are accurate.
5. Reporting and Financial Statements – Aside from compliance with the government agencies such as COA and BIR, Financial Statements are prepared to help interested parties, both internal and external, to make business decisions.

3.2.3 Engineering Division

This division has two sections engineering and construction section and the production section.

The engineering and construction focuses on five different activities namely, maintenance of pipe networks, monitoring and construction of district facilities, conducting survey and preparation of work and estimates for all construction projects, non-revenue management, installation and maintenance of service connections, and accomplishing job orders prepared by the commercial division.

The production section has three functions namely, monitoring and ensuring the water production from the different water sources, ensuring the potability and safety of the water produced by conducting scheduled water bacteriological/ laboratory tests, and conducting source explorations to ensure the sustainability of the water supply.

The division also assists in the different watershed management activities like tree planting activities and watershed monitoring.

3.3 Operating Procedures

3.3.1 Production

3.3.1.1 Water Source and Treatment Process

3.3.1.1.1 Caramayon Spring Source (Pumping Station)

Operating Procedure

- a. Inspect the Sump Tank if full of water.
- b. Record the Flow meter Reading Water and KWHR Reading of SAMELCO Meter.
- c. Inspect the Line Voltage if Complete (3 Lines 440V)
- d. Close the Discharge Valve and Open the Backwash Pipe in order to Feed the Line Gradually and Discharge the Air.
- e. Switch On Main Breaker.
- f. Start the Soft Starter.
- g. As the Pump Start, Gradually close the backwash pipe valve at the same time open the discharge valve so the water flow to the system, until that Backwash Pipe Valve close and full open the discharge valve.

Electrical Failure

During Operation some electrical failure occurs:

- a. Line Low Voltage – cause by line fault of Electrical Cooperative, Operator call the attention of electric cooperative.
- b. Soft Starter Failure – call the technician for immediate repair.

Equipment Preventive Maintenance

- a. Clearing Weekly the soft starter and facility other electrical appurtenances.
- b. Clearing the Sump tank weekly
- c. Clearing of surrounding and check up valves weekly.

Production Monitoring

- a. After 24 hour operation, Operator record the Flow meter reading and KWHR reading. They subtract the reading to get the production KWHR for one day operation.

Water Supply

- a. Record the turbidity reading if it conforms to the PNSDW which is 5 ntu. When it is turbid or above 5 ntu pump operation will be stopped.

3.3.1.2 Bacteriological and Laboratory Testing

To ensure and properly monitor the safety of the water supply, bacteriological and laboratory test are conducted regularly.

The bacteriological test covers sample source address, date and time of collection, result of analysis, and remarks. The test is conducted and analyzed by Leyte Metropolitan Water District having a qualified laboratory.

The laboratory test is done twice a week with seventeen sample points. These covers the location where sample is taken, time taken, chlorine residual, salinity, conductivity, total dissolve solids, turbidity, and name of registered customer where sample is taken.

3.3.1.2.1 **BACTERIOLOGICAL TEST (Monthly – LWUA compliance)**

Water Sampling/Testing & Reporting

- a. Sampling from a tap or household faucet at random (ensure that areas covered shall be well represented)
- b. Clean the tap or faucet (wipe the outlet with a clean cloth to remove dirt)
- c. Turn on the tap at maximum flow rate and let the water flow for 1-2 minutes
- d. Sterilize the tap for 1-minute with the flame from an ignited cotton-wool swab soaked in alcohol (denatured and/or 70% Isopropyl)
- e. Carefully turn on the tap and allow 1-2 minutes at a medium flow rate prior to sampling
- f. Open a sterilized bottle and immediately hold the bottle under the water jet and fill the bottle at least 100ml of water sample. A small air space should be left to facilitate shaking at the time of inoculation prior to analysis
- g. Capped the bottle and shall be labeled properly
 - g.1) Date & Time of sampling
 - g.2) Source/Point of sampling
- h. Deliver water samples to nearest DOH accredited laboratory center (EVRMC or LMWD)
- i. Using of ice cooler during transport to the laboratory center is recommended
- j. Water Sample Collector shall also take into consideration the following important reminders:
 - j.1) That water analysis shall be done 6-hours from the time of collection
 - j.2) That the time of lapsing between collection and processing should in no case exceed 24-hours
- k. Upon availability of the laboratory result/s, prepare the Summary Report on Microbiological Test (Pre-Format), filling-up all the necessary data and information and send to LWUA-Management Advisor for compliance/reference (attached the laboratory results)

3.3.1.2.2 **BACTERIOLOGICAL TEST (Monday & Wednesday – For Water Quality Monitoring/Detection of Coliform Organisms)**

Water Sampling/Testing & Reporting

- a. Sampling from a tap or household faucet at random (ensure that areas covered shall be well represented)
- b. Clean the tap or faucet (wipe the outlet with a clean cloth to remove dirt)
- c. Turn on the tap at maximum flow rate and let the water flow for 1-2 minutes
- d. Sterilize the tap for 1-minute with the flame from an ignited cotton-wool swab soaked in alcohol (denatured and/or 70% Isopropyl)
- e. Carefully turn on the tap and allow 1-2 minutes at a medium flow rate prior to sampling
- f. Fill the prepared PHC Bottle leaving small air space
- g. Capped the bottle and shall be labeled properly
 - g.1) Date & Time of sampling
 - g.2) Source/Point of sampling

- h. Place the water samples (PH Bottle) at room temperature for about 24-hours
 - h.1) Water samples turn blackish – indicates the presence of coliform organisms. Investigate possible reason/s or possible source/s of contamination to make the necessary precautionary reparation, and shall water sampling & testing shall be done from the identical spot from which the first sample was taken for comparison and confirmation of result
 - h.2) No changes in appearance/color indicate absence of any coliform organisms
- i. Encode results and prepare the Summary Report on Bacteriological Test Result (Format), filling-up all the necessary data and information and send to the City Health Office (City Sanitation Inspector) for conformity and reference.

Preparation of PHC Bottle (50 bottles every 2- months)

- a. Cleaning of PHC Bottles
 - a.) Dilute 1-2 drops of Muriatic Acid, and soak PHC Bottles
 - b.) Wash every single PHC bottle thoroughly with running water at maximum flow rate, then let it dry
- b. Preparation of PHC Media

Prepare the medium; combine the following

 - 1.5 grams - Dipotassium Hydrogen Phosphate
 - 0.75 gram – Ferric Ammonium Citrate
 - 1.5 grams – Sodium Thiosulfate
 - 20.0 grams Peptone
 - 1.0 gram Teepol
 - 50.0 grams Distilled Water
- c. Fold several times half of a sheet of tissue (toilet paper) paper and placed at the bottom of the PHC Bottle
- d. Dropped 1-ml of Medium (PHC Media) into the tissue paper
- e. Sterilized the bottles using Pressure Cooker for about 10-minutes at medium heat, and then allowed to stand at room temperature with UV Lamp (Black/Violent Light) for 24-48 hours, and the PHC Bottles is ready for utilization or usage.

3.3.1.2.3 LABORATORY TEST (Monday to Sunday) (20-sampling points)

Water Sampling/Testing: Parameters/Permissible Limit)

a.) Chlorine Residual (Free) (1.0 ppm) (ProHayward Tester)

- a.1) Sampling from a tap or household faucet at random (ensure that areas covered shall be well represented)
- a.2) Clean thoroughly the tap or faucet (wipe the outlet with a clean cloth to remove dirt)
- a.3) Turn on the tap at maximum flow rate and let the water flow for 1- 2 minutes
- a.4) Remove the cap from the tube CL and rinse

- a.5) Fill CL tube with water sample until the level with line just under CL marking on tube
- a.6) Remove cap from OTO solution, and place nozzle of OTO bottle vertically over opening in CL tube and squeeze 5-drops of solution into CL tube
- a.7) Place cap on CL tube and invert the tube several times to mix OTO with water sample, and within 10-seconds, compare the tube color with the adjacent color markings to determine the numerical reading, and record the result for the preparation of report for management file and reference

b.) Salinity (500 ppm S); Conductivity (no limit); Total Dissolved Solid (500 mg/L) (Ultra Pen PT1)

- b.1) Sampling from a tap or household faucet at random (ensure that areas covered shall be well represented)
- b.2) Clean thoroughly the tap or faucet (wipe the outlet with a clean cloth to remove dirt)
- b.3) Turn on the tap at maximum flow rate and let the water flow for 1- minute, then fill bottle (350-ml) with water sample
- b.4) Using the PT1 Tester, press and release push button to turn the PEN ON
- b.5) While the LED flashes rapidly; dip the pen in water sample so that the cell is completely submerged
- b.6) While the LED flashes slowly, swirl PEN around to remove bubbles, keeping cell submerged.
- b.7) When LED turns on solid, remove PEN from water sample, display will alternate between measurement (Salinity, Conductivity, TDS & Temperature) readings
- b.8) Rinse the cell and electrodes with clean water after each use, and before the next water sample measurements & readings
- b.9) record the result for the preparation of report for management file and reference

c.) Turbidity (5.0 NTU) (Hach DR/820 Colorimeter)

- c.1) With the remaining water sample/s above (350-ml water sample taken), press the button to turn the Tester (Colorimeter) ON
- c.2) Set the Tester at Program 95
- c.3) For calibration purposes, fill cell with 10-ml Distilled or Deionized Water
- c.4) Wipe the surface of the cell with a soft cloth, and place in cell holder
- c.5) Cover and press ZERO, then take out from the cell folder c.6) Fill a separate cell with 10-ml water sample for analysis
- c.7) Mix the sample well before transferring to the sample cell. Wipe the surface of the cell with a soft cloth
- c.8) Place in cell holder, cover and READ
- c.9) Rinse the cell with clean water after each use, and before the next water sample measurements & readings
- c.10) record the result for the preparation of report for management file and reference

d.) pH (6.5-8.5 mg/L) (Hach Pocket Pro Tester)

- d.1) With the remaining water sample/s above (350-ml water sample taken), press the button to turn the Tester (Pocket Pro) ON
- d.2) Fill the sensor cap with water sample up the indicated line
- d.3) Place in the sensor cap to the pocket pro ensuring that it is well submerged, then read and record the result for the preparation of report for management file and reference

3.3.1.2.4 PHYSICAL-CHEMICAL TEST (Once a Year – LWUA compliance)

- a. Physical Quality Parameters – Color & Turbidity
- b. Chemical Quality Parameter – pH, Chloride, Nitrate, Sulfate, Total Dissolved Solid, Benzene, Iron, Manganese, Arsenic, Cadmium & Lead)
- c. Other Physical & Chemical parameters based on specific source conditions

3.3.1.2.4.1 Caramayon Spring Source (Pumping Station)

Water Sampling/Testing & Reporting:

- a. Before water sample is collected from the tap (faucet), sufficiently flush to ensure that the sample is representative of the supply.
- b. Clean the tap or faucet (wipe the outlet with a clean cloth to remove dirt)
- c. Open the bottle (1.5 liters) , then capped the bottle and labeled properly
 - c-1) Date & Time of sampling
 - c-2) Source/Point of sampling
- d. Deliver water samples to any DOH accredited laboratory center (government & private) for analysis
- e. Upon availability of the test result/s, send Physico-Chemical Test Results for Water to LWUA-Management Advisor for compliance/reference

Water Quality Monitoring (Turbidity) (Portable Turbidimeter with Fast Tracker HI 98703):

- a. Turn the instrument on by pressing ON/OFF. When dashes are displayed on the LCD, the instrument is ready.
- b. Fill a clean, dry cuvette with 10-ml of sample up to the mark, taking care to handle the cuvette by the top
- c. Replace the cap
- d. Wipe the cuvette thoroughly with a lint-free cloth to remove any fingerprints, dirt or water spots
- e. Apply silicone oil on the cuvette and wipe with a lint-free cloth to obtain an even film over the entire surface of the cuvette. Silicone oil hides the glass imperfections that can influence the reading
- f. Place the cuvette into the instrument. Align the mark from the cuvette with the sign on the instrument case and close the lid
- g. Press READ to start the measurement. The display will show blinking dashes and the icons for cuvette, detectors and lamp will appear during measurement
- h. At the end of the measurement, the instrument directly displays turbidity in NTU

- i. Record the result, including the date, time and weather & power condition for reference

3.3.1.2.4.2 Masacpasac Spring

Water Sampling/Testing & Reporting:

- a. Before water sample is collected from the tap (faucet), sufficiently flush to ensure that the sample is representative of the supply.
- b. Clean the tap or faucet (wipe the outlet with a clean cloth to remove dirt)
- c. Open the bottles for collection of water sample (1.5 liters bottle), then capped the bottle and labeled properly
 - c.1) Date & Time of sampling
 - c.2) Source/Point of sampling
- f. Deliver water samples to any DOH accredited laboratory center (government & private) for analysis
- g. Upon availability of the test result/s, send Physico-Chemical Test Results for Water to LWUA-Management Advisor for compliance/reference

3.3.1.2.4.3 Kulador Surface Water (Pesticides as additional Parameter)

Water Sampling/Testing & Reporting:

- a. Before water sample is collected from the tap (faucet), sufficiently flush to ensure that the sample is representative of the supply.
- b. Clean the tap or faucet (wipe the outlet with a clean cloth to remove dirt)
- c. Open the bottles (1 of 1.5 liters bottle for other Parameters and 2- liters Amber Bottle for Pesticides) Capped the bottle and labeled properly
 - c-1) Date & Time of sampling
 - c-2) Source/Point of sampling
- d. Deliver water samples to any DOH accredited laboratory center (government & private) for analysis
- e. Upon availability of the test result/s, send Physico-Chemical Test Results for Water to LWUA-Management Advisor for compliance/reference

Water Quality Monitoring (Turbidity) (Portable Turbidimeter with Fast Tracker HI 98703):

- a. Turn the instrument on by pressing ON/OFF. When dashes are displayed on the LCD, the instrument is ready.
- b. Fill a clean, dry cuvette with 10-ml of sample up to the mark, taking care to handle the cuvette by the top
- c. Replace the cap
- d. Wipe the cuvette thoroughly with a lint-free cloth to remove any fingerprints, dirt or water spots
- e. Apply silicone oil on the cuvette and wipe with a lint-free cloth to obtain an even film over the entire surface of the cuvette. Silicone oil hides the glass imperfections that can influence the reading

- f. Place the cuvette into the instrument. Align the mark from the cuvette with the sign on the instrument case and close the lid
- g. Press READ to start the measurement. The display will show blinking dashes and the icons for cuvette, detectors and lamp will appear during measurement
- h. At the end of the measurement, the instrument directly displays turbidity in NTU
- i. Record the result, including the date, time and weather condition for reference

3.3.1.2.4.4 Clarifier System

A. Dosing of Chemicals

- a. Mix 12.5-kgs. of PolyAluminum Chloride (PAC) to 100-liters of Water at 90 Stroke/80 Speed
- b. Mix 100-grams of Polymer to 100-liters of Water at full stroke (100- stroke)
- c. Mix 5.5-kgs. of Granular Chlorine (70%) to 100-liters of Water at full stroke (100 stroke) for Pre-Chlorination
- d. Inject chemicals (PAC, Polymer & Chlorine) to the 8" Pipeline to the Flocculation Tank

B. Flocculation Tank

- a. Monitor water quality using the Portable Turbidimeter with Fast Tracker HI 98703 tester
- b. Turn the instrument on by pressing ON/OFF. When dashes are displayed on the LCD, the instrument is ready.
- c. Fill a clean, dry cuvette with 10-ml of sample up to the mark, taking care to handle the cuvette by the top
- d. Replace the cap
- e. Wipe the cuvette thoroughly with a lint-free cloth to remove any fingerprints, dirt or water spots
- f. Apply silicone oil on the cuvette and wipe with a lint-free cloth to obtain an even film over the entire surface of the cuvette. Silicone oil hides the glass imperfections that can influence the reading
- g. Place the cuvette into the instrument. Align the mark from the cuvette with the sign on the instrument case and close the lid
- h. Press READ to start the measurement. The display will show blinking dashes and the icons for cuvette, detectors and lamp will appear during measurement
- i. At the end of the measurement, the instrument directly displays turbidity in NTU
- j. Record the result, including the date, time and weather & power condition for reference
- k. Monitor/Check the tank for sediments (floc) accumulation to determine the need to open the drain valve

C. Clarifier System

- a. Monitor water quality using the Portable Turbidimeter with Fast Tracker HI 98703 tester (same process/procedure stated above)

- b. Monitor/Check the tank for sediments (floc) accumulation to determine the need to clean using pressure washer and drain.

D. Bag Filters (12-units)

- a. Monitor water quality using the Portable Turbidimeter with Fast Tracker HI 98703 tester (same process/procedure stated above)
- b. Check filter bags to determine the need for replacement/change to avoid clogging and backflow
- c. Clean/Wash the clogged filter bags, and let it dry for impending usage. Ensure that sufficient filter bags are readily available for emergency cases (Heavy rains/Typhoon) at the treatment plant.

E. Post-Chlorination

- a. Mix 5.5-kgs. of Granular Chlorine (70%) to 100-liters of Water at full stroke (100 stroke) for Post-Chlorination
- b. Monitor/Test the Chlorine Residual (Total) using the ProHayward Tester.
- c. Fill CL tube with water sample until the level with line just under CL marking on tube
- d. Remove cap from OTO solution, and place nozzle of OTO bottle vertically over opening in CL tube and squeeze 5-drops of solution into CL tube
- e. Place cap on CL tube and invert the tube several times to mix OTO with water sample, and within 10-seconds, compare the tube color with the adjacent color markings to determine the numerical reading (1-1.5ppm), adjust the Chlorinator settings (Pulse & Stroke/Speed) if the results is below 1-ppm and record the result for file and reference
- f. Using the Chlorinator Equipment, supply the disinfected (Chlorinated) water

3.3.1.2.4.5 Executive (Pumping Station) Water Sampling/Testing & Reporting:

- a. Before water sample is collected from the tap (faucet), sufficiently flush to ensure that the sample is representative of the supply.
- b. Clean the tap or faucet (wipe the outlet with a clean cloth to remove dirt)
- c. Open the bottle (1.5 liters) , then capped the bottle and labeled properly
 - c-1) Date & Time of sampling
 - c-2) Source/Point of sampling
- d. Deliver water samples to any DOH accredited laboratory center (government & private) for analysis
- e. Upon availability of the test result/s, send Physico-Chemical Test Results for Water to LWUA-Management Advisor for compliance/reference

Water Quality Monitoring (Chlorine Residual) (Chlorinator):

- a. Mix & Stir thoroughly $\frac{3}{4}$ kls. (750 grams) of Granular Chlorine (70%) to 100-liters of water in a container (200 liters) (good for 1- week operation)
- b. Test the Chlorine Residual (Total) using the ProHayward Tester.
- c. Fill CL tube with water sample until the level with line just under CL marking on tube
- d. Remove cap from OTO solution, and place nozzle of OTO bottle vertically over opening in CL tube and squeeze 5-drops of solution into CL tube
- e. Place cap on CL tube and invert the tube several times to mix OTO with water sample, and within 10-seconds, compare the tube color with the adjacent color markings to determine the numerical reading (1-1.5ppm), adjust the Chlorinator settings (Pulse & Stroke/Speed) if the results is below 1-ppm and record the result for file and reference
- f. Using the Chlorinator Equipment, supply the disinfected (Chlorinated) water. Pumping Hours (6:00 a.m. to 8:00 a.m. and 6:00 p.m. to 7:00 p.m. daily)
- g. Occasionally stirring the mixture (about every 1-hour)
- h. Test the residual of chlorine before every pumping hours/operation
- i. Clean the chlorine injector & sensor at least every 3-days
- j. Check-up the Chlorinator Equipment every operation to prevent failure and clogging
- k. Record the result, including the date, time and power & weather condition for file and reference

3.3.1.2.4.6 Tumalistis (Pumping Station) Water Sampling/Testing & Reporting:

- a. Before water sample is collected from the tap (faucet), sufficiently flush to ensure that the sample is representative of the supply.
- b. Clean the tap or faucet (wipe the outlet with a clean cloth to remove dirt
- c. Open the bottle (1.5 liters) , then capped the bottle and labeled properly
 - c-1) Date & Time of sampling
 - c-2) Source/Point of sampling
- d. Deliver water samples to any DOH accredited laboratory center (government & private) for analysis
- e. Upon availability of the test result/s, send Physico-Chemical Test Results for Water to LWUA-Management Advisor for compliance/reference

Water Quality Monitoring (Chlorine Residual) (Chlorinator):

- a. Mix & Stir thoroughly $\frac{3}{4}$ kls. (750 grams) of Granular Chlorine (70%) to 100-liters of water in a container (200 liters) (good for 1- day operation)
- b. Test the Chlorine Residual (Total) using the ProHayward Tester.
- c. Fill CL tube with water sample until the level with line just under CL marking on tube

- d. Remove cap from OTO solution, and place nozzle of OTO bottle vertically over opening in CL tube and squeeze 5-drops of solution into CL tube
- e. Place cap on CL tube and invert the tube several times to mix OTO with water sample, and within 10-seconds, compare the tube color with the adjacent color markings to determine the numerical reading (1-1.5ppm), adjust the Chlorinator settings (Pulse & Stroke/Speed) if the results is below 1-ppm and record the result for file and reference
- f. Using the Chlorinator Equipment, supply the disinfected (Chlorinated) water. Pumping Hours/Schedule (6:00 a.m. to 1:00 p.m.; 4:00 p.m. to 8:00 p.m. and 10:00 p.m. to 3:00 a.m. daily)
- g. Occasionally stirring the mixture (about every 1-hour)
- h. Test the residual of chlorine before every pumping hours/operation
- i. Frequently clean the chlorine injector & sensor
- j. Check-up the Chlorinator Equipment every operation to prevent failure and clogging
- k. Record the result, including the date, time and other power interruption/failure (if any) for file and reference

3.3.1.2.4.7 Lagundi (Pumping Station) Water Sampling/Testing & Reporting:

- a. Before water sample is collected from the tap (faucet), sufficiently flush to ensure that the sample is representative of the supply.
- b. Clean the tap or faucet (wipe the outlet with a clean cloth to remove dirt
- c. Open the bottle (1.5 liters) , then capped the bottle and labeled properly
 - c-1) Date & Time of sampling
 - c-2) Source/Point of sampling
- d. Deliver water samples to any DOH accredited laboratory center (government & private) for analysis
- e. Upon availability of the test result/s, send Physico-Chemical Test Results for Water to LWUA-Management Advisor for compliance/reference

Water Quality Monitoring (Chlorine Residual) (Chlorinator):

- a. Mix & Stir thoroughly $\frac{3}{4}$ kls. (750 grams) of Granular Chlorine (70%) to 100-liters of water in a container (200 liters) (good for 1- day operation)
- b. Test the Chlorine Residual (Total) using the ProHayward Tester.
- c. Fill CL tube with water sample until the level with line just under CL marking on tube
- d. Remove cap from OTO solution, and place nozzle of OTO bottle vertically over opening in CL tube and squeeze 5-drops of solution into CL tube
- e. Place cap on CL tube and invert the tube several times to mix OTO with water sample, and within 10-seconds, compare the tube color with the adjacent color markings to determine the

- numerical reading (1-1.5ppm), adjust the Chlorinator settings (Pulse & Stroke/Speed) if the results is below 1-ppm and record the result for file and reference
- f. Using the Chlorinator Equipment, supply the disinfected (Chlorinated) water. Pumping Hours/Schedule (6:00 a.m. to 1:00 p.m.; 4:00 p.m. to 8:00 p.m. and 10:00 p.m. to 3:00 a.m. daily)
 - g. Occasionally stirring the mixture (about every 1-hour)
 - h. Test the residual of chlorine before every pumping hours/operation
 - i. Frequently clean the chlorine injector & sensor
 - j. Check-up the Chlorinator Equipment every operation to prevent failure and clogging
 - k. Record the result, including the date, time and other power interruption/failure (if any) for file and reference

3.3.1.2.4.8 Payao (Pumping Station) Water Sampling/Testing & Reporting:

- a. Before water sample is collected from the tap (faucet), sufficiently flush to ensure that the sample is representative of the supply.
- b. Clean the tap or faucet (wipe the outlet with a clean cloth to remove dirt
- c. Open the bottle (1.5 liters) , then capped the bottle and labeled properly
 - c-1) Date & Time of sampling
 - c-2) Source/Point of sampling
- d. Deliver water samples to any DOH accredited laboratory center (government & private) for analysis
- e. Upon availability of the test result/s, send Physico-Chemical Test Results for Water to LWUA-Management Advisor for compliance/reference

Water Quality Monitoring (Chlorine Residual) (Chlorinator):

- a. Mix & Stir thoroughly $\frac{3}{4}$ kls. (750 grams) of Granular Chlorine (70%) to 100-liters of water in a container (200 liters) (good for 1- day operation)
- b. Test the Chlorine Residual (Total) using the ProHayward Tester.
- c. Fill CL tube with water sample until the level with line just under CL marking on tube
- d. Remove cap from OTO solution, and place nozzle of OTO bottle vertically over opening in CL tube and squeeze 5-drops of solution into CL tube
- e. Place cap on CL tube and invert the tube several times to mix OTO with water sample, and within 10-seconds, compare the tube color with the adjacent color markings to determine the numerical reading (1-1.5ppm), adjust the Chlorinator settings (Pulse & Stroke/Speed) if the results is below 1-ppm and record the result for file and reference
- f. Using the Chlorinator Equipment, supply the disinfected (Chlorinated) water. Pumping Hours/Schedule (6:00 a.m. to

1:00 p.m.; 4:00 p.m. to 8:00 p.m. and 10:00 p.m. to 3:00 a.m. daily)

- g. Occasionally stirring the mixture (about every 1-hour)
- h. Test the residual of chlorine before every pumping hours/operation
- i. Frequently clean the chlorine injector & sensor
- j. Check-up the Chlorinator Equipment every operation to prevent failure and clogging
- k. Record the result, including the date, time and other power interruption/failure (if any) for file and reference

3.3.1.3 NRW reduction

3.3.1.3.1 Leak Detection

3.3.1.3.2 District Metering Zone

3.3.1.3.3 Database and Geo-tagging in GIS Maps

3.3.2 COMMERCIAL

3.3.2.1 Service Connection Application

3.3.2.1.1 Application Process

- Submit duly filled up application form together with:
- Brgy. Certification, Tax Declaration/ Land Title (Proof of Ownership)
- Community Tax Certificate (Cedula)
- Photo of valid ID
- Permit of concrete cutting/ excavation as required
- Upon receiving the accomplished application, applicant will attend orientation seminar (Scheduled: Mon & Wed – 4:00 PM, Friday - 9:00 AM) Provide certificate of appearance

3.3.2.1.2 Investigation for proper classification

- Prepare letter informing customer his proper classification

3.3.2.1.3 Survey for proper costing and pipe size identification

- Prepare 2 job orders for investigation and survey
- After approval of investigations and survey for estimates of materials needed and investigations for what classifications it may belong

3.3.2.1.4 Recording New Customer Information in Database and GIS

- Informing the applicant for payment of installation fee through texting
- Upon payments NWSC's application will be forwarded to Manager Commercial Division and then to Engineering Division Manager for schedule of installation.
- After accomplishment of NWSC will be back to front liner and recording New Customer Information in Database and GIS

3.3.2.2 Customer Complaints and request

3.3.2.2.1 Filing complaints and request

- Filing complaints and Request to all registered consumers and it depends what complaints and Request

3.3.2.2.2 Job/Maintenance order preparation and monitoring

- Report request details/assess request and prepare job order for maintenance (if not need of survey and investigation)

- If request needs survey and investigation, prepare job order for investigation and survey and for investigation and approval and job order for survey forwarded to Engineering Division.

3.3.2.2.3 **Monthly generation of complaints summary report**

3.3.2.3 **Billing and Collection**

The current billing cycle of the district is only covering 25 working days. This includes meter reading up to the last day of penalty date. The district currently utilizes the read and bill technology which makes the activity efficient.

A database is maintained to keep all the records of customers which give ease in the billing process and answering customer complaints and inquiries. The said system is installed in all of the computers of the commercial section and is connected to a local area network.

Currently the district has two (2) tellers conducting regular collection activities. During due dates, another teller is assigned to help in the collection. This is due to the bulk of customers during due dates. Field collection is also conducted by meter readers using handheld computers to enhance the collection efficiency of the district.

3.3.2.3.1 **Meter Reading and Billing**

- Zero, High & Low Consumption
- Create Billing Schedule of Reading
- Create Pahibaro to DYMS for the Billing Schedule
- Check all CWM, Reopen, Cut-off, Re-sequence, Transfer of Tapping, Transfer of Zone (Rezoning) were encoded in the system
- Create Readers' Reading Schedule for the month (This is a rotation schedule of meter readers in four books per zone and its projected number of billed concessionaires)
- Upload Data for Reading – uploading data of accounts from billing system to reading Device
- Meter Reading – meter reader input the current WM reading to the reading device and automatic prints an Statement of Account that will be given to the concessionaires
- Download data from reading device - after reading, data from reading device will be uploaded to the system.

3.3.2.3.2 **Billing Report Generation**

- Zero, High & Low Consumption
- Prooflist
- Negative Reading
- Unread Accounts
- Creating Billing Adjustment Memo
- Creating Debit/Credit Memo
- Billing List
- Transaction Report
- Penalty List
- Disconnection Notice and Summary

- Ageing Summary
- Uncollected Bills Report

3.3.2.3.3 **Customer Payment of Bills**

- Give Customer Priority Number
- Posting of payment and printing of water bill
- Prepare Daily Tellers Report for at least 25 water bills collection
- Prepare Daily Summary Collection Report
- Prepare Deposit Slip for the amount collected for the day and turn over to the cashier for deposit

3.3.2.3.4 **Penalty and Disconnection Orders**

- Water bills not paid on due date plus one day allowance are subject of the 10% penalty
- Customers with unpaid accounts of 2 months are subject for Disconnection after giving 48hrs notice

3.3.2.4 **Job Order Preparation and Accomplishment**

The job/maintenance order is prepared by the customer assistants to answer the different requests of the customers. This is generated and monitored from the billing database of the district.

The job/maintenance order is a pre-numbered document which can be monitored every day. There are different type of maintenance order, Survey, Investigations, disconnection, Repair and maintenance, water calibration and testing.

Process and flowcharts which would describe the flow of the said activity is attached as appendices.

Appendices 3.11 Job Order Preparation

Appendices 3.12 Job Order Accomplishment and Monitoring

3.3.2.5 **Dealing with Delinquent Accounts**

- Prepare Collection Letter informing customer to settle accounts within 15 days
- Send Demand Letter signed by Legal Counsel through post office
- Filing of Small Claims at MTC

3.3.2.6 **Cashiering**

The cashier utilizes a computerized system that aids in the preparation of the different reports and monitoring of daily cash on hand and cash in bank.

3.3.2.6.1 **Check Preparation**

- Received Check Disbursement Voucher from the Accounting Division with corresponding amount stated and supporting document attached

- In checking preparation, checks to be made by the cashier with the date of Check, Name of payee, Amount of Check, Amount in words, lastly the name of signatories signed by the authorized signatories of the agency
- After check prepared and signed, disbursement of check issue

3.3.2.6.2 **Cash Security**

- Cash and Checks collection from tellers and cashier received and deposit to the bank daily and the cash on hand for the day kept in safety vault for safekeeping and deposit it to the following day.

3.3.2.6.3 **Cash Position Report Preparation**

- The Cash Position Report is prepared daily by the Cashier which shows the ending balances for the day with Cash On Hand and balances from different banks
- The Cash Position Report is consist of the following:
 - a. Daily Collection Report submitted by the Tellers with corresponding Cash and bills paid by the concessionaires.
 - b. Daily Disbursement Report made by the Cashier for the issuance of checks to the payee.
 - c. Daily Cash Position Report made by the Cashier showing the Collection for the day and Disbursement for the day and ending balances.

3.3.2.7 **Other Services offered**

3.3.2.7.1 **Reconnection**

- Those disconnected customers that have already paid their arrears and reconnection fee
- After payment we prepare job order for reconnection and if it is more than 2 months from the time of orientation seminar and job order for reconnection will be forwarded to Engineering Division for reconnection

3.3.2.7.2 **Disconnection**

- Those customers who have delinquent accounts (we have a month policy after the reading of the second month that is the schedule for cut-off).
- Before disconnection we set a disconnection letter stated the date when their service connection will be disconnected by our cut-off team.

3.3.2.7.3 **Change Meter**

- Inform customer the life span of water meter is only five years from the time it was installed
- Defective water meter

3.3.2.7.4 **Recalibration**

- After the investigation of high and low consumption and zero consumption the investigator recommend for calibration of water

meter, sometimes the consumer itself requested for calibration and they paid Php 50.00.

3.3.2.7.5 **Change Registration**

- Requested by the consumer to change the registration of their WSC , the requirements are as follows:
- Xerox copy of 1 valid ID
- Cedula
- Any: Deed of Sale / Death Certificate / waiver of the previous owner
- Orientation seminar
- Change Registration Fee Php 50.00
- Notarial of service contract Php 50.00

3.3.2.7.6 **Service Request**

- If the service requests for investigation the job order will be forwarded to Commercial Division. If the service request for maintenance the job order will be forwarded to Engineering Division

3.3.2.7.7 **Customer Report Generation**

- Detailed Report of Complaints
- Summary Report of Complaints
- List of NWSC Report
- List of ReOpen/NWSC
- List of Reconnection
- List of Disconnected
- Daily Accomplishment Report
- List of Change Classification
- List of Change Meter
- List of Transfer Tapping
- List of Change Registration
- List of Meter Recalibrated
- List of Accounts Availed the Promo
- List of Senior Citizen
- Master List

3.3.3 **ADMINISTRATIVE**

3.3.3.1 **Human Resource**

The Human Resource Management Information System was installed to effectively implement the processes and functions in the Human Resource Section.

3.3.3.1.1 **Time and Attendance / Reporting to Office**

- Step 1. Employee before entering the office in the morning shall time in the biometrics, press F1 for IN and sign in the Employees Logbook.
- Step 2. Then at noon time employee will press F2 for BREAK time and sign in the employees Logbook before going out the office.

Step 3. In the afternoon, before entering the office employee will time in the biometrics, press F3 for (RESUME), sign in the Employees Log book.

Step 4. In the afternoon before going out will press F4 for OUT and sign in the Employees Logbook.

Employees when going out of the office are required to use the Pass Slips.

Step 1. Employees will get Pass Slip form at the HR Section, fill-up up the form.

Step 2. After filling-up, employees will proceed to their respective Division Heads, submit the Pass Slip for approval may it be official or personal.

Step 3. Employees with approve Pass slips can now leave the office, gave the Pass Slips to the guard on duty for recording the time of departure and arrival in the office.

Step 4. At the end of the day, all Pass slips in the custody of the guard on duty shall be turn-over to the HR Section for recording purposes.

3.3.3.1.2 Leave Card Updating and Reporting

Leave Card updating and monitoring involves the following process:

Step 1. Open the Biometrics system, upload the attendance and save the excel file.

Step 2. Post the attendance of the employees, if they are present, absent, on leave, CTO, on travel, on training/seminar or on official business, and with overtime works.

Step 3. After posting, all employees with application for leave will be automatically be recorded and deducted in their respective leave cards.

Step 4. Every last working day of the month, leave credit earning is posted and automatically recorded in the leave cards.

3.3.3.1.3 Filing of Leaves and Compensatory Time-Off (CTO) Filing of Leave:

Step 1. Employee will ask from the HR Section the form on Application for Leave, then fill-up the upper portion of the form (Detail of Application).

Step 2. After filling-up the form, it will be submitted to the HR Section to fill-up the portion of the form (Details of Action on Application)

Step 3. HR Section will received the Application for Leave for processing, then print-out the Leave Card as attachment for validation of the available leave credits balances.

Step 4. After filling-up the form, HR Section will forward the Application for Leave to the Head, Administrative Division for Certification and forward to the Division Head of the employee applying for leave for signature as recommending official whether approved or disapproved.

Step 5. After the Division Head, signed, it will be forwarded to the Head of Office for final action of the Application for Leave, whether APPROVE OR DISAPPROVE.

FILING OF COMPENSATORY TIME-OFF (CTO)

Step 1. Employee will ask from the HR Section the form on CTO, then fill-up the form.

- Step 2. After filling-up the form, it will be submitted to the HR Section to fill-up the form of COC Earned and balances at the end
- Step 3. HR Section will received the Application for CTO for processing, then print-out the COC Card as attachment for validation of the available COC balances.
- Step 4. After filling-up the form, HR Section will forward the Application for CTO to the Head, Administrative Division for Certification and forward to the Division Head of the employee applying for CTO for signature as recommending official whether approved or disapproved.
- Step 5. After the Division Head, signed, it will be forwarded to the Head of Office for final action of the Application for CTO, whether APPROVE OR DISAPPROVE.

3.3.3.1.4 **201 Filing and E-filing**

All employees of Catbalogan Water District has its 201 File under the custody of the Human Resource Section. The 201 File is maintain by the HR Section. Each 201 File contain the following:

- a. Appointment (CSC Form 33)
- b. Assumption of Duty
- c. Personal Data Sheet (CSC Form 212)
- d. Position Description Form
- e. Oath of Office
- f. Certificate of Eligibilities
- g. Copies of Medical Certificate
- h. NBI Clearance
- i. Copies of Diplomas, Transcript of Records (TOR)/Commendations/Awards
- j. Copies of Marriage Certificate
- k. Copies of Disciplinary Action
- l. Designations
- m. Notice of Salary Adjustments/Step Increments
- n. Certificate of Leave Balances (if Transferees)
- o. Clearance from Property and Money Accountabilities (if Transferees)
- p. Certificate from Training/Seminar

201 File of Leave Cards has a separate folder. Also employees copies of their SALN, IPCR, DPCR, Withholding Certificate form has separate folder.

Employees who attended training/seminars shall furnished the HR Section photocopy of their certificate. Employees who have changes/update in their status, additional dependents and beneficiaries and continuous studies shall furnish the HR Section photocopy of document, for the purpose of updating their 201 File.

201 File is keep safe in the steel cabinet.

E- FILING

E-filing is done thru scanning process of all the documents found in the 201 File of employees and kept in the USB which serves as a back-up file.

3.3.3.1.5 Request for Personal Data Sheet (PDS), Service Records, and Leave Cards/COC

In requesting the above documents, employees may approach the HR Section and request copies of their Personal Data Sheet, Service Records and Leave Cards whenever they are in need.

HR Section will attend their request by printing their PDS, Service Records and Leave Cards/COC and forward the requested documents to the Head of Office for signature, the service record shall be countersigned by the Head of Administrative Division before the signature of the Head of Office.

3.3.3.1.6 Report Generation

The reports generated every end of the month are the following:

- a. Daily Time Records
- b. Leave Cards
- c. Compensatory Overtime Credits (COC)
- d. Balances of Leave Credit
- e. Leave Monitoring

3.3.3.1.7 Rating of Performance Targets: Division Performance Commitment Review / Individual Performance Commitment

Step 1. Division Heads prepares their DPCR for the semester January – June and July – December of every year for two rating period.

Step 2. Division Heads distribute task to their employees and agrees and prepares their IPCR.

Step 3. Planning Office consolidate, review, validate and evaluate performance assessments submitted by the Division Heads after six months.

Step 4. PMT calibrate results of assessment by Planning Officer and submit to the General Manager.

Step. 5 General Manager rates and approval the final rating of the Division Heads.

Step. 6 Planning Officer prepares summary list of and provides the Division Heads of their final rating as approved by the General Manager.

Step. 7 After the Division Units had been rated, the Division Heads will assess and discuss the submitted employees IPCR with accomplishments and rates their staff.

Step 8. Division Heads submits the IPCR to the HRMO

Step 9. The HRMO will consolidates all the IPCR and submits to the General Manager for approval.

3.3.3.2 Stock and Supplies Inventory

The stock and supplies inventory of the district currently have a computerized system in maintaining, updating the stock / supplies records. Purchases and

issuances of stocks, and including the monitoring of properties are the different process in this activity.

3.3.3.2.1 **Purchasing and Stocking of Supplies and Equipment**

- a. Every Division prepare Purchase Requisition 3 copies and Request for Quotation 3 copies. Submit the Purchase Requisition to the General Manager for approval.
- b. Approved Purchase Requisition and Request for Quotation will be forwarded to the Property Officer. Give the Request for Quotation to the Utility Man to canvass items in three (3) Store or Suppliers.
- c. Upon Receipt of the Request for Quotation the Property Officer will now prepare the Abstract of Bids and submit to the Bidding Committee for approval.
- d. Received approved Abstract of Bids and prepare Purchase Order in three (3) copies with BIR Certificate. Serve the Purchase Order to the Supplier for them to sign and conformed and deliver the items to Catbalogan Water District.
- e. Upon receipt items in the Purchase Order it will be inspected and preparation of Inspection and Acceptance Report will now be done and automatically posted in the stock card.

3.3.3.2.2 **Issuance of Stocks and Supplies**

- a. Each Division will prepare Requisition and Issued Slip using the CWD RIS Form. Approved RIS will be given to the Property Officer for release of their request materials or supplies.

3.3.3.2.3 **Generation of Inventory Reports**

- a. The Schedule for the Physical Inventory of Office Equipment and other equipment in the Pumping Station is always done every month of December (once a year) while the stocks of materials and supplies is always check or counted every end of the month for us to reorder whatever is locking in our stocks.

3.3.3.2.4 **Updating Meter History Card**

- a. Once the RIS for the new water service connection and change of water meter is prepare the water meter is automatically recorded in the meter History Card.

3.3.4 **FINANCE**

3.3.4.1 **Financial Reports Preparation**

3.3.4.1.1 **Preparation of Billing Journal**

- a. Receive Daily Billing Summary from the Commercial Division
- b. Post the Data in Accounting System and Prepares the Journal Entry
- c. Check the Correctness of the Billing Journal

3.3.4.1.2 **Preparation of Cash Receipt Journal**

- a. Prepare the Daily Cash Position Report (DCPR)
- b. Check the DCPR

- c. Post the DCPR to the Accounting System daily and make the Journal Entry at the end of each month
- d. Check the correctness of the Cash Receipt Journal

3.3.4.1.3 Preparation of Disbursement Voucher

- a. Submit necessary documents to Accounting section
- b. Check the completeness of the document and prepare Budget Utilization Slip (BUS).
- c. Certifies the availability of budget funds
- d. Prepares the Disbursement Vouchers
- e. Certifies the completeness of the documents and if the DV is Proper

3.3.4.1.4 Preparation of Journal Vouchers

3.3.4.1.5 Preparation of Financial Statements

3.3.4.1.6 Balancing of A/R in accounting and commercial

3.3.4.1.7 Preparation of Monthly Data Sheet

- a. Ask necessary data from Engineering, Commercial and Administrative Division
- b. Input Data to the MDS form
- c. Print Report

Annex H
**Catbalogan Water District Disaster Risk Reduction
Management Plan (CWD-DRRMP)**



Catbalogan Water District

Disaster Risk Reduction Management Plan

Adopted December 2, 2021

Chapter I

1.1 Introduction

Water crisis and climate change are some of the social and economic risks of Catbalogan Water District. Disaster as a whole has the ability to affect people, properties and the services of providing potable water. It is vital that in the aftermath of a disaster, a water supply should be operational as soon as possible to minimize the outbreak of diseases.

As per record since year 2013 to present, several calamities or weather disturbance adversely affected the District's water sources and other facilities and caused mild to severe damage to the District's transmission and distribution lines, facilities and pumping stations.

On November of 2013, Super Typhoon "Yolanda" causes power outages that lasted for months which greatly affected the district's operation and water services. The Local Water Utilities Administration (LWUA) extended their helping hand by granting 2-units of 20-KVA Generator Sets, including Genset Trailer and Dosing Pumps for the treatment plant.

On December 2014, two Typhoons hit Samar Island, "Seniang" and "Ruby" that have brought long and continuous rain causing severe saturation of soil that causes landslide and flooding. A huge landslide occurred along Masacpasac and Kulador Transmission Pipeline causing destruction to said pipelines. Some pipes were washed-out, other were disconnected, and there was a difficulty during the repair works due the steep location, that causes prolong water interruption. Another area affected by landslide, was Purok 5 Brgy. Mercedes; 15 Water Service Connections (WSC) and 24-linear meter of 4" Extension Line was damaged, and several lives and properties were lost.

On July 6, 2017, a Magnitude 6.5 Earthquake struck the Northern sector of Leyte Island in the Central Philippines. The epicenter of which was located about 6.5KM North-Northeast of Ormoc City in a region that triggered by an active geothermal system. Because of this, the NGCP's Tower 18 in Aguiting, Kananga, Leyte collapsed that causes power outages in the whole region (Eastern Visayas).

On December of 2017, Tropical Storm "Urduja" brings heavy and continuous rains before and after its landfall and caused heavy damage to the transmission pipelines, particularly the Caramayon and Nasarang-Kulador Transmission Pipelines. Water interruption took several days due to huge destruction and difficulty in the repair works.

On September 24, 2020 although there was no announcement of weather disturbance, a continuous heavy rains causes flash flood that damaged the 42-linear meter of 10" Ø Masacpasac Mainline equivalent to 7-pieces of 10"Ø x 6meter PVC Pipes has been damaged and was repaired and replaced immediately to avoid long water interruption.

The recent deluge of disasters in many parts of the world has provoked governments around the world to put in place Disaster Risk Reduction Management Plan. In the Philippines, we have Republic Act No. 10211 or the

Philippine Disaster Risk Reduction and Management Act of 2010 which institutionalizes risk reduction and management plans at the local level. Among others, the law mandates the creations of local risk reduction and management office in all provinces, cities, municipalities and barangays which shall be responsible for setting the direction, development, implementation and coordination of disaster risk management programs within their territorial jurisdiction.

Generally, there are two (2) types of disasters that we have to contend with and prepare for to wit:

1) Natural Disasters

Urban Infrastructure is highly vulnerable to natural disasters. Failures of these structures, such as water supply and other pipeline systems will most likely result to major impacts in terms of human lives and economic losses. Natural disasters can be any or combination of the following:

- a) Typhoons
- b) Landslides
- c) Floods
- d) La Niña phenomenon
- e) El Niño phenomenon/ Droughts
- f) Earthquakes

2. Man-Made Disasters or Human Induced Disasters

Damage to or destruction of water supply facilities due to human intervention can disrupt the delivery of vital water services, threaten public health and may even cause loss of lives. Some man-made disasters are:

- a) Vandalism
- b) Fires/Conflagration
- c) Power Failures
- d) Systems Failures
- e) Accidents

Disasters in the operations of Catbalogan Water District may also occur due to neglect and/or failure of the organization to properly institute and adhere to maintenance procedures.

The concern now is whether Catbalogan Water District can respond to disasters to avert its negative effects on water services due to contamination of water supplies, prolonged discontinuity of service, loss of fire-fighting capability and among others.

1.2. Disaster Risk Reduction Management Plan

When a disaster hits the country, it is not always the national government that acts first. Catbalogan Water District is tasked to come up with a framework for disaster risk reduction and management as well as supervise, preparations for, and responses to, natural calamities and human induces disasters. Catbalogan Water District is expected to be at the frontline of emergency measures in the aftermath of disasters to ensure the general welfare of its consumers.

Though one must always remember that it is not always possible to completely eliminate a risk, extensive experience and practice in the past have demonstrated that the damage caused by any disaster can be minimized largely by disaster preparedness, response, prevention and mitigation, and rehabilitation and recovery.

The Disaster Risk Reduction Management Plan is consistent with the National Disaster Risk reduction Management Plan in which Republic Act 10121 is the enabling law and be implemented by the Water District's officials and employees.

The Disaster Risk Reduction Management Plan of the Catbalogan Water District is an information guide to the relevant stakeholders. It is a continuing process to be developed and it will always be everybody's concern. The workflow and coordination is supposed to ensure and facilitate quick response before, during and after disaster situations.

1.3. Purpose of the Disaster Risk Reduction Management Plan

The Disaster Risk Reduction Management Plan of the Catbalogan Water District aims to ensure the least possible impact on water supply during and after emergency and disaster situations. It also aims to enhance the capability of the Catbalogan Water District to prevent extreme damage and to immediately address the same.

Specifically, this plan aims to:

- a) Provide policies and procedures to maintain quantity and quality of service even during adverse conditions;
- b) Identify potential disaster situations and the methods for responding to these situations quickly and effectively;
- c) Facilitate decision-making on critical issues in a potentially stressful environment and define responsibilities and roles during a crisis situation;
- d) Establish guidelines in addressing public relations and communications issues that may potentially arise from disaster, dealing with the media and communicating with the consumers;
- e) Protect employees and consumers by minimizing injuries and maintaining their security and integrity; and
- f) Secure the properties of the Catbalogan Water District.

This Plan is also in accordance with the NDRRMP in which the four (4) distinct and mutually reinforcing priority areas are to be achieved namely:

- a. Disaster Prevention and Mitigation
- b) Disaster Preparedness;
- c) Disaster Response; and
- d) Disaster Recovery and Rehabilitation.

Each priority area has its own long term goal, which when put together will lead to the attainment of the District and the national's over- all goal and vision in DRRM.

It is crucial to have an effective and efficient Disaster Risk Management Plan in order to save lives, properties and prevent escalation of emergencies and incidents and relieve suffering.

1.4 Phases of Disaster Risk Management

The Disaster Risk Reduction Management Plan involves the following phases:

1) Disaster Prevention and Mitigation – Measures taken in advance of a hazard impact aimed at reducing its impact on society and environment. The activities includes:

- a) Hazard/risk identification and assessment – develop, update and disseminate hazard maps and related information to decision makers, general public and communities at risk.
- b) Enforcement of zoning, land-use and building and fire codes.
- c) Integrating/mainstreaming disaster risk management
- d) Developing early warning systems that are people-centered, timely and understandable to those at risk

2) Disaster Preparedness – measures undertaken to prepare people to react appropriately during and following such emergencies. It involves the following activities:

- a) Planning – disaster management plans, contingency plans, Standard Operating Procedures and others,
- b) Advocacy – information dissemination through mass media, enhancing people's awareness through the conduct of disaster management fora/briefing, observance of disaster consciousness month, etc.
- c) Education and training of officers, employees, deputized coordinators, CWD-DRRMT and volunteers. The conduct of drills and exercises, community based disaster risk management trainings.
- d) Resources – Manpower, materials, methods, machines and money.

3) Disaster Response – undertaken immediately after the emergency. Such measures are directed towards saving life, property, and dealing with the immediate damage caused by the disaster. Below are the activities associated with response:

- a) Early warning – timely and rapid dissemination of warnings to threatened communities/population
- b) Notification – mobilization and activation of response teams or the CWD-DRRMT
- c) The “Golden Hour” Principle – the time within which most lives could be saved and minimized injuries
- d) Incident Command System – on scene management of disaster operation activities.

4) Disaster Recovery and Rehabilitation – includes measures undertaken to restore affected communities/areas to their proper or normal level of functioning and development with reduces vulnerability and increased sustainability. This can be categorized into:

- a) Short Term – restoring necessary lifeline systems (i.e. power, communications, water and sewerage, transportation, etc.) providing for basic human needs (food, clothing and shelter) and monitoring law and order
- b) Long Term – restoring economic activity and development, rebuilding community facilities and housing, healing, repair and reconstruction in a way that is less vulnerable to future hazard impacts.

1.5. Acronyms and Abbreviations

| | |
|-----------|---|
| CWD | Catbalogan Water District |
| CWD DRRMP | Catbalogan Water District-Disaster Risk Reduction Management Plan |
| CWD DRRMT | Catbalogan Water District-Disaster Risk Reduction Management Team |
| BDRRMC | Barangay Disaster Risk Reduction Management Council |
| CCA | Climate Change Adaptation |
| CCC | Climate Change Commission |
| CDRRMC | City Disaster Risk Reduction Management Council CHED Commission on Higher Education |
| DA | Department of Agriculture |
| DAR | Department of Agrarian Reform |
| DENR | Department of Environment and Natural Resources |
| DepEd | Department of Education |
| DILG | Department of Interior and Local Government |

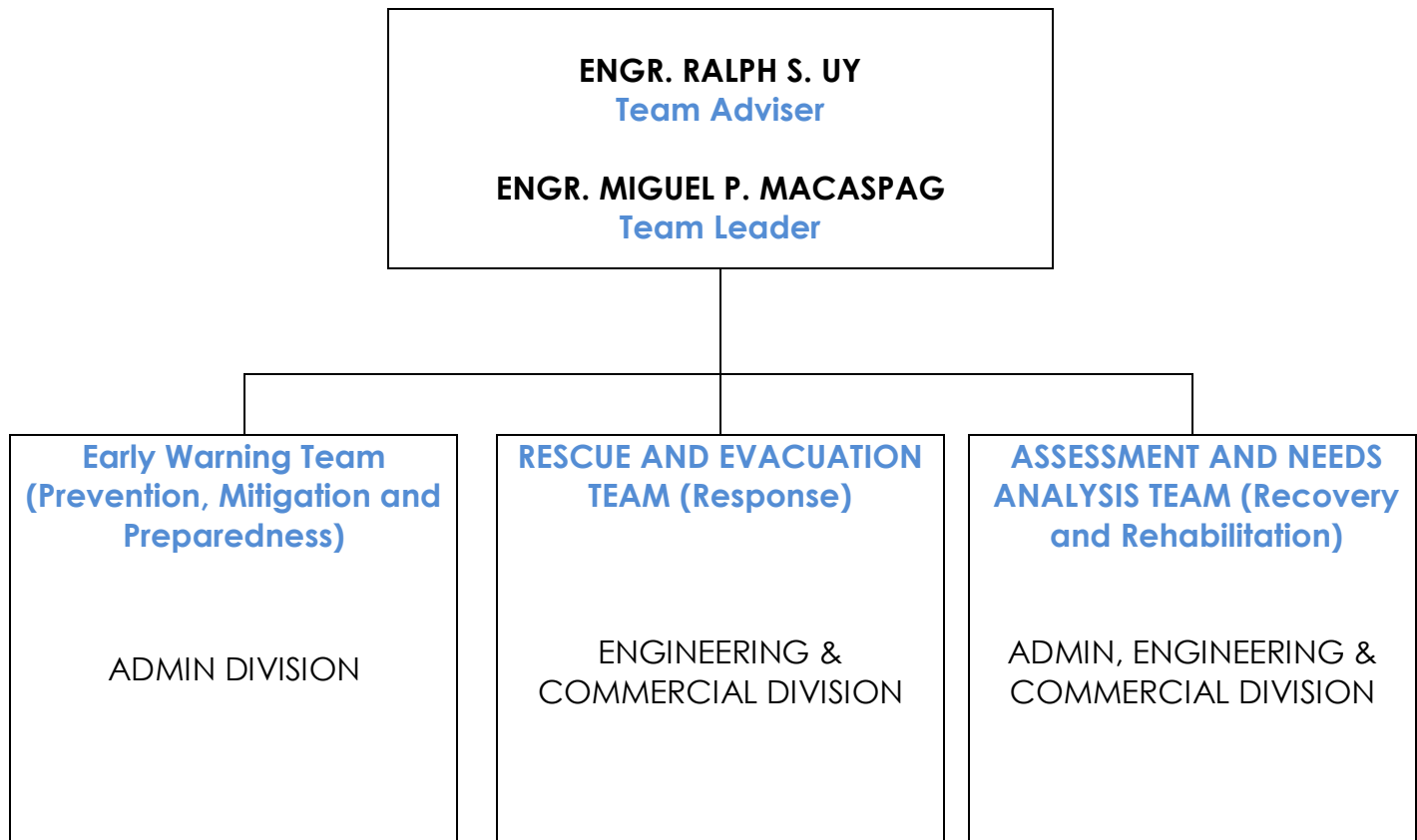
| | |
|--------|--|
| DOE | Department of Energy |
| DOH | Department of Health |
| DOST | Department of Science and Technology |
| DPWH | Department of Public Works and Highways |
| DRR | Disaster Risk Reduction |
| DRRMP | Disaster Risk Reduction Management Plan |
| DSWD | Department of Social Welfare and Development |
| IEC | Information, Education and Communication |
| LGU | Local Government Unit |
| LWUA | Local Water Utilities Administration |
| MDG | Millennium Development Goals |
| NDRRMC | National Disaster Reduction Management Council |
| NEDA | National Economic and Development Authority |
| PAGASA | Philippine Atmospheric, Geophysical and Astronomical Services Administration |
| PAR | Philippine Area of Responsibility |
| PDP | Philippine Development Plan |
| PDRRMC | Provincial Disaster Risk Reduction Management Council |

Chapter II

2.1. Catbalogan Water District – Disaster Risk Reduction Management Team (CWD DRRMT) Structure

The Catbalogan Water District Disaster Reduction Risk Management Team (CWDDRRMT) is a working team of officers and employees of the Catbalogan Water District established pursuant to Republic Act No. 10121 series of 2009. It is led by the General Manager of the CWD. The Team is responsible for ensuring the protection and welfare of the CWD consumers and its employees, people and the community during disasters or emergencies.

CWDDRRMT STRUCTURE



2.2. Composition of the CWDDRRMT

The CWDDRRMT is a working team of the CWD in charge of planning, organizing and guiding the use of human, materials and financial resources and implementation of the four distinct and mutually reinforcing priority areas, namely: (a) Disaster Prevention and Mitigation; (b) Disaster Preparedness; (c) Disaster Response; and (d) Disaster Recovery and Rehabilitation. Each priority area has its own long term goal, which when put together will lead to attainment of CWD's over-all vision/goal in DRRMP.

These priority areas are not autonomous from the other nor do they have clear start and end points. The 4 priority areas are not mere cycle which starts in prevention and mitigation and ends in rehabilitation and recovery. They are:

- a) Mutually reinforce to each other and are interoperable;
- b) Do not, Should not, and Cannot stand alone;
- c) Has no clear starting or ending points between each of the aspects and overlaps are to be expected;
- d) Are problem needs and asset strengths centered; and
- e) All point to one direction which is to reduce people's vulnerabilities and increasing their capabilities.

| Team | Members | Responsibility |
|--------------|---------|---|
| Team Adviser | GM | <ol style="list-style-type: none"> 1) Establishes policy guidelines and set priorities in the allocation of resources and facilities; 2) Direct and coordinate all the CWDDRRM team; 3) Directs and monitors all emergency activities; 4) Assigns personnel as needed; 5) Advises the Team Leader to closely monitor information/advisory given by warning agencies; and 6) Announces the suspension of offices on the basis of advisories given by warning agencies; |
| Team Leader | | <ol style="list-style-type: none"> 1) Reports to the Team Adviser all the activities of the CWDDRRMT; 2) Oversees the activities of all teams; 3) Coordinate with CDRRMC and other warning agencies of the plans and actions of the CWDDRRMT whenever crisis occurs; 4) Monitor and evaluate the probable consequences of potential, on-going and past disasters; 5) Coordinates pre-defined and post disaster operational activities being undertaken by the CWDDRRMT; |

| Team | Members | Responsibility |
|---|---------|--|
| Team Leader | | <ul style="list-style-type: none"> 6) Notifies and updates the Team Adviser on the status of water quality, production and distribution immediately before, during and after the disasters; 7) Determines the resumption of normal operation; 8) Assess the conditions of structural, electrical, and mechanical components of all facilities of CWD including but not limited to the pump stations, transmission and distribution lines and reservoirs; 9) Performed related work as may be assigned by the Team Adviser. |
| Early Warning Team (Prevention, Mitigation and Preparedness) | | <ul style="list-style-type: none"> 1) Provide warning in close coordination with warning agencies and through all available means to the service areas, consumers and employees and providing a clear understanding of what to expect and advises on appropriate precautionary measures to be undertaken; 2) Alert the CWDDRRMT and closely monitor the conduct of disaster response operations, mobilizing additional resources available as may be needed in the field; 3) Maintain an updated database of relevant baseline information (Pumping Stations and other facilities); 4) Document all past disaster situations to include a review of the pre-post disaster activities undertaken by all key personnel, and maintain a database of these documents; 5) Determine course of actions to be taken based on the recommendations of the Team Leader; 6) Coordinates with the Rescue and Evacuation Team of the operations being undertaken and those to be implemented; |
| Rescue and Evacuation Team (Disaster Response) | | <ul style="list-style-type: none"> 1) Ensure availability of personnel and materials and maintain a current list of personnel location; 10 2) In the event of evacuation, account all personnel and immediately inform the CWDDRRMT of any missing personnel; 3) Facilitate flow of information to officers and employees thru all forms of communication devices; |

| Team | Members | Responsibility |
|------|---------|---|
| | | <p>4) Coordinate the administration of First Aid including the identification and disposition of people receiving such care.</p> <p>5) Ensure that available funds are mobilized quickly and effectively for the procurement of supplies and payment of services;</p> <p>6) Ensure availability of in-house and rental vehicles and machinery for quick mobilization;</p> <p>7) Determine the safest route out of an emergency area and ensure security of people and property;</p> <p>8) Coordinate with other agencies in determining the disasters and the situations;</p> <p>9) In case of fire, assigns a sub-group to assist the BFP in operating the fire hydrants near the fire scene;</p> <p>10) Secure properties brought to the evacuation area and safeguard the same until the situation normalized;</p> <p>11) Maintains a security system for all CWD properties;</p> <p>12) Make an inventory of the returned documents, equipment, and other supplies and submit a report of any losses/damages to the Team Leader who shall submit the same to the Team Adviser;</p> <p>13) Maintain an adequate sanitation and hygienic standards and deal with matters related to emergency services;</p> <p>14) Monitor the storage of medicines, goods, food, drinking water, equipment, machineries and other supplies;</p> <p>15) Perform related work as the need arises;</p> <p>16) Organize and supervise the evacuation, search and rescue, fire suppression; and rehabilitation;</p> <p>17) Determine courses of action to be taken based on the recommendations of the Team Leader of the GM</p> <p>11 18) Systematically evacuate personnel, properties and records during emergency situations;</p> <p>19) Upon receipt of information from the Early Warning Team, the team shall immediately establish an evacuation area and take charge of evacuation in the following order of priority: a) occupants of the building especially the injured; b) cash; c) valuable documents and</p> |

| Team | Members | Responsibility |
|---|---------|--|
| | | <p>records; d)personal belongings of personnel; e)office equipment and other movable facilities;</p> <p>20) Locate/remove injured or trapped persons in the area;</p> <p>21) Obtain appropriate equipment for search and rescue operations;</p> <p>22) Coordinate with CDRRMC and other response agencies on matters related to search and rescue operations;</p> |
| <p>Damage Assessment and Needs Analysis Team (Disaster Recovery and Rehabilitation)</p> | | <p>1) Evaluate crisis situations and determine courses of actions to be followed, formulate guideline in assessing the situation;</p> <p>2) Assess information and advise the Team Leader of CWDDRRMT on possible measures to be undertaken in order to lessen the impact of the crisis;</p> <p>3) Submit recommendation for allocation of needed resources;</p> <p>4) Coordinate the plans and actions of the CWDDRRMT with the proper authorities;</p> <p>5) Monitor the probable consequences of potential, on-going and past disasters or emergency situations in close coordination with other agencies;</p> <p>6) Coordinate pre-defined and post disaster operational activities being undertaken by relevant agencies and ensure that all key personnel are taken on board;</p> <p>7) Initiate and evaluate the damages and needs assessment mission as the post disaster situation warrants;</p> <p>8) Facilitate the conduct of debriefing of past disaster situation to look into areas of strength and areas for improvement;</p> <p>9) Allocate working stations of all teams;</p> <p>10)Conduct monitoring and damage assessment of CWD properties and reports the same to the 12 Team Leader and to the Team Adviser;</p> <p>11)Validate report, determine cost of damages for budget allocation, and recommend appropriate intervention for damaged structures; and</p> <p>12)Repair and rehabilitate damage structures and facilities</p> |

2.3. Functions of the CWDDRRMT

The role of the Catbalogan Water District Disaster Risk Reduction Management Team is to conceptualize the promotion of hazard/disaster awareness, to manage impacts, and to assist all employees and the community to reduce the risk of threats from natural and human-made/induced disasters.

The Disaster Risk Reduction Management Plan of the Catbalogan Water District provides procedures pursuant to Republic Act 10121 otherwise known as the Philippine Disaster Risk Reduction and Management Act of 2010. This Manual serves as the guide of the CWDDRRMT for the disaster preparedness and response, including management and risk reduction. The adopted 4-phase strategy: prevention and mitigation, preparedness, response and recovery and rehabilitation illustrate the basic procedures that the CWDDRRMT will employ before, during and after the occurrence of a disaster.

The ultimate goal of this Manual is to protect the lives of the officers and employees and the properties of the District, and to ensure the immediate restoration of water supply after a disaster.

The officers and members of the CWDDRRMT must:

- 1) Analyze the condition of the District's water supply system and conduct situational analysis;
- 2) Identify possible hazards/threats;
- 3) Strictly follow the CWDDRRMP especially in times of emergencies, calamity/disaster;
- 4) Provide feedback to the Team Adviser and the Board of Directors for policy formulation;
- 5) Request the officers of all agencies concerned for any assistance.

To effectively achieve the expected response in times of emergency and calamity, CWD Officers and employees and CWDDRRMT must take time to understand the contents of this Manual, practice and internalize the risk reduction measures to eventually make a habit of being prepared before, during and after calamity, be it natural or human-made/induced hazard.

2.4. Designated Emergency Areas

In order to respond in a coordinated fashion to an emergency or disaster, the Office of the General Manager is designated as Command Post. It shall be the meeting place of the CWDDRRMT and all other personnel as may be called upon by the Team Adviser and CWDDRRMT Team Leader during an emergency situation. The CWDDRRMT command post shall be at the control and disposal of the CWDDRRMT Adviser and Team Leader.

In disasters where there is a need to evacuate employees and consumers outside the CWD Building, the assembly area shall be at the open parking area/CWD compound.

Chapter III- Natural Hazards

The Philippine Islands are prone to all kinds of natural hazards because of their geographical location and physical environment. The country is strategically located in the path of turbulent and destructive cyclones in the Pacific, and the “Ring of Fire”. This situation has adverse effects, not only on the lives and properties of the Filipino people, but also on the economy of the nation, as hazard impacts may result in widespread environmental and property damages.

Natural hazards may cause danger to people, to the District's consumers, its system and properties and may lead to disaster if they are not mitigated against and prepared for. Phenomena that are atmospheric, hydrometeorological or oceanographic and geographical in nature may cause the loss of life or injury, property damage, social and economic disruption and/or environmental degradation. Hydrometeorological and geographical hazards can be single, sequential or a combination in origin and effects. The common hazards associated with these are heavy rains, strong winds, storm surge, floods and landslides/mudslide and mud flow.

Geological hazards are normal and their processes occur as irregular events with direct interaction with the environment. They are capable of causing significant negative impact on human well-being. Their non-rhythmic occurrence makes their predictability difficult. An important characteristic of many geological hazards is their prime land preference – the characteristic of preferentially occupying areas targeted by man for his use. Almost all types of geological hazards occur in the Philippines except hazards associated with glaciers and seasonal snowfall. Hazards arising from volcanic eruptions, earthquakes and other related geotectonic phenomena such as landslide, tsunami and faulting are the most mitigated ones due to the frequency of their occurrence.

The natural hazards are further categorized in this Manual as water supply service crisis. The water supply service crisis may potentially and directly affect the water system and consequently the continuous provision of water supply.

The following are the natural hazards that may be further categorized as water supply service crisis, their effects on the water supply system of the CWD and the adopted 4-phase strategy of this Manual.

| Natural Hazards | Description/Type | Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|--------------------|--|---|---|--|--|
| 1. Typhoons | <p>Tropical cyclone, also called typhoon or hurricane, an intense circular storm that originates over warm tropical oceans and is characterized by low atmospheric pressure, high winds, and heavy rain. Drawing energy from the sea surface and maintaining its strength as long as it remains over warm water, a tropical cyclone generates winds that exceed 119 km (74 miles) per hour. In extreme cases winds may exceed 240 km (150 miles) per hour, and gusts may surpass 320 km (200 miles) per hour. Accompanying these strong winds are torrential rains and a devastating phenomenon known as the storm surge, an elevation of the sea surface that can reach 6 metres (20 feet) above normal levels. Such a combination of high winds and water makes cyclones a serious hazard for coastal areas in tropical and subtropical areas of the world.</p> | <ol style="list-style-type: none"> 1) Partial or total damage to facilities, pump stations, command posts & building, including broken windows, damaged roofs & doors, and flooding. 2) Breakage of Transmission mains in exposed areas such as rivers and streams. 3) Disjointing of pipes due to landslides and flooding. 4) Damage to electrical power lines. 5) Damage to UHF Radio antennae 6) High turbidity level due to continuous heavy rains. | <ol style="list-style-type: none"> 1) Conduct coordination meeting with the CWDDRRMT & the Team Adviser. 2) Evaluate and assess the stability of the CWD structures and facilities, pumping stations, electrical posts and transmission lines. 3) Undertake necessary precautions and measure to ensure that the CWD structures and facilities, pumping stations, electrical posts and transmission lines can withstand heavy rains & strong winds. 4) Monitor the weather disturbance, their signs & warnings, effects & dangers from PAGASA & other weather station websites. 5) Periodic orientation of all employees especially those at | <ol style="list-style-type: none"> 1) Monitor through radio or other sources of information for typhoon updates. 2) Coordinate with the CWDDRRMT & the Team Adviser for possible evacuation of employees, records, tools, machineries & equipment. 3) Advise Field Personnel to take precautionary measures from falling debris and structures. | <ol style="list-style-type: none"> 1) Check the office building, pump stations, reservoirs, transmission & distribution lines & power lines for any damage. 2) Assess the damage for immediate repair to avoid inconvenience and service interruption. 3) Inspect the whole pipe network to restore back to normal operation the soonest possible time. 4) Remind employees stationed at the field and pumping station to continually observe safety measures. 5) Coordinate with proper authorities for possible assistance. |

| Natural Hazards | Description/Type | Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|----------------------|--|---|---|-----------------------------------|--|
| | | | <p>the field on natural hazards.</p> <p>6) Participate actively in disaster response–drill or simulation.</p> <p>7) Secure megaphone as alternative alarm system.</p> <p>8) Listen to radio & TV for information & updates.</p> <p>9) Prepare flashlights & back up batteries.</p> <p>10) Recommend trimming and removal of dead or rotting trees that could fall and may cause damage or injury.</p> <p>11) Secure outdoor objects that could be blown away & cause damage.</p> <p>12) Check up the generator set, fuels, oils and lubricants for standby power.</p> | | |
| 2. Landslides | A landslide is the movement of rock, earth, or debris down | 1) Changes in the physical and chemical | 1) Prepare evacuation of tools, machineries, | 1) Evacuate the tools, equipment, | 1) Coordinate with proper authorities to conduct a |

| Natural Hazards | Description/Type | Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|-----------------|--|---|---|---|--|
| | <p>a sloped section of land. Landslides are caused by rain, earthquakes, volcanoes, or other factors that make the slope unstable. Geologists, scientists who study the physical formations of the Earth, sometimes describe landslides as one type of mass wasting. A mass wasting is any downward movement in which the Earth's surface is worn away. Other types of mass wasting include rockfalls and the flow of shore deposits called alluvium. Near populated areas, landslides present major hazards to people and property.</p> | <p>characteristics of water supply.</p> <ol style="list-style-type: none"> 2) Breakage of Transmission mains in exposed areas such as rivers and streams. 3) Disjointing of pipes due to landslides and flooding. 4) Total or partial destruction of facilities, transmission lines in landslide prone area. 5) High turbidity level due to soil erosion. | <p>equipment and vehicles upon the direction of warning agencies.</p> <ol style="list-style-type: none"> 2) Continue the reforestation program by planting of trees. 3) Provide slope protection to prevent soil erosion. 4) Stabilize the structure surrounding the water sources and pumping stations. 5) Conduct regular drills on evacuation procedures. 6) Coordinate to proper authorities to enforce land use regulation geared at mitigating landslides. 7) Promote public awareness & involvement on landslide mitigation. 8) Coordinate and recommend to the concern agencies for consideration in | <p>machineries and vehicles upon warned of an impending landslide.</p> <ol style="list-style-type: none"> 2) Advise Field Personnel to take precautionary measures from the path of the landslide debris or seek refuge behind stable structure. 3) Get out from the Pumping Stations when a rumbling sounds is heard or the trembling of the ground is felt indicating a possible mudflow. 4) Run across the slopes not downward. | <p>thorough examination of the damaged structures and facilities before re- occupying or reutilizing.</p> <ol style="list-style-type: none"> 2) Stay away from landslide area for possible additional soil erosion until declare clear and safe by proper authority. 3) Check with caution the injured or trapped persons within the landslide area. 4) Assist rescuer to the locations. 5) Listen to radio and other form of mass media information for any updates. 6) Seek the advice of a geotechnical expert for evaluating landslide hazards or designing corrective techniques to reduce landslide risk. |

| Natural Hazards | Description/Type | Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|------------------|---|---|---|---|---|
| | | | providing channels, irrigation canals, pathways, dams & similar structures to protect the Antiao River. | | |
| 3. Floods | A flood is an overflow of water that submerges land that is usually dry. In the sense of "flowing water", the word may also be applied to the inflow of the tide. Floods are an area of study of the discipline hydrology and are of significant concern in agriculture, civil engineering and public health. Human changes to the environment often increase the intensity and frequency of flooding, for example land use changes such as deforestation and removal of wetlands, changes in waterway course or flood controls such as with levees, and larger environmental issues such as climate change and sea level rise. In particular climate change's increased rainfall and extreme weather events increases the severity of other causes for flooding, resulting | <ol style="list-style-type: none"> 1) Damage to pumping stations and pipelines. 2) Total or partial destruction of facilities, transmission lines in landslide prone area. 3) High turbidity level due to soil erosion. 4) Damage to exposed pipes across and along rivers and streams. 5) Water Contamination in catchment areas. | <ol style="list-style-type: none"> 1) Investigate any existence of flood in all the pumping stations and other facilities. 2) Review the history of flooding incidents on how fast and high the flooding occurs. 3) Prepare announcement informing the consumers 4) Store/stock water for use during water interruption. 5) Provide a safety gear and first aid kit to pump and treatment plant operators. 6) Keep documents and other valuables in a safe place. | <ol style="list-style-type: none"> 1) Update personnel of the situation. 2) Advise Field Personnel and operators to take precautionary measures from snakes and other crawling animals. 3) Evacuate the CWD documents, machineries, equipment if the situation worsen. | <ol style="list-style-type: none"> 1) Inform disconnected transmission & distribution lines to the Team Leader and to the Team Adviser. 2) Ensure that electrical power lines of the pumping equipment, are checked properly with the assistance of SAMELCO II personnel before switching on. 3) Continue listening to radios & other updates. 4) Provide barriers or ripraps to stop flood from entering water sources & pumping stations. 5) Check for any damage on water supply system for immediate repair to avoid water |

| Natural Hazards | Description/Type | Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|--|--|--|--|---|--|
| | in more intense floods and increased flood risk | | | | <p>interruptions.</p> <p>6) Treat water supply and continuously monitor water quality before distribution.</p> <p>7) Check the water pipelines along service area for any damage or leakages for immediate repair to avoid contamination.</p> |
| <p>4. Extreme Climatic Variabilities (i.e. El Niño, La Niña, Heat waves, Droughts, etc.</p> | <p>Climate change is the long-term alteration of temperature and typical weather patterns in a place. Climate change could refer to a particular location or the planet as a whole. Climate change may cause weather patterns to be less predictable. These unexpected weather patterns can make it difficult to maintain and grow crops in regions that rely on farming because expected temperature and rainfall levels can no longer be relied on. Climate change has also been connected with other damaging weather events such as more frequent and more intense hurricanes, floods, downpours, and winter storms.</p> | <p>During drought or El Niño:</p> <ol style="list-style-type: none"> 1) Reduction & depletion of surface groundwater sources. 2) Decline water levels at intake points & storage facilities. <p>During La Niña:</p> <ol style="list-style-type: none"> 1) Damage of exposed pipes across and along Rivers and streams. 2) High turbidity in water sources. 3) Saturation of slope embankment. | <ol style="list-style-type: none"> 1) Disseminate information to stakeholders of extreme climate change issues. 2) Save energy through the use of energy efficient lightings, appliances and equipment. 3) Continue the tree planting activity at the Catbalogan watershed area. 4) Provide tips on how to conserve water. 5) Provide first aid kit | <ol style="list-style-type: none"> 1) Conduct/monitor daily activities (i.e. valving for water rotation and water rationing) to affected consumers in the service area. 2) Advise the consumers to save water and fill their drums during off peak hours for future consumption. 3) Utilize all available water sources. 4) Monitor water production. | <p>After drought:</p> <ol style="list-style-type: none"> 1) Documentation of El Niño effect for future reference. <p>After La Niña:</p> <ol style="list-style-type: none"> 1) Documentation of La Niña effect for future reference. 2) Assess damage for immediate repair and rehabilitation. |

| Natural Hazards | Description/Type | Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|----------------------|--|---|---|---|--|
| | <p>La Niña is a climate pattern that describes the cooling of surface ocean waters along the tropical west coast of South America. La Nina is considered to be the counterpart to El Nino, which is characterized by unusually warm ocean temperatures in the equatorial region of the Pacific Ocean.</p> <p>A heatwave is an extended period of hot weather relative to the expected conditions of the area at that time of year, which may be accompanied by high humidity. Heatwaves are most common in summer when high pressure develops across an area. High pressure systems are slow moving and can persist over an area for a prolonged period of time, such as days or weeks. Globally, the increasing frequency and intensity of heat waves observed since the 1950s has been associated with climate change.</p> | | and medicine | <p>5) Monitor water quality.</p> <p>6) Provide field personnel rain coats, rain boots & other supplies for weather protection.</p> <p>7) Bring employees victim of heat stroke to the hospital.</p> | |
| 5. Earthquake | | 1) Total or partial damage of water sources, transmission | 1) Evaluate the Structural soundness of the office building, pumping stations and other | 1) Advise employees to stay in a safe place. | 1) Check and give first aid to employees with cuts and injuries. |

| Natural Hazards | Description/Type | Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|-----------------|------------------|--|--|---|--|
| | | <p>and distribution lines, facilities and structures.</p> <p>2) Interruption of electrical power, communication lines and access road.</p> | <p>facilities and water supply system.</p> <p>2) Familiarize officers & Employees with the exit or evacuation route during emergencies.</p> <p>3) Prepare and post at CWD strategic place the evacuation plan or map.</p> <p>4) Train employees how to use the fire extinguishers, first aid kits, alarm and exits.</p> <p>5) Request assistance from the BFP for the conduct of orientation and earthquake drill.</p> | <p>2) Perform the Drop, Cover and Hold protocol. (Drop from the floor, cover your head & hold on to solid object)</p> <p>3) When inside a vehicle, pull at the side of the road and stop.</p> <p>4) Stay away from power lines, walls or posts & other structures that may fall or collapse.</p> <p>5) Stay away from buildings with large glass panes.</p> | <p>2) Check the surroundings of the office building & pump houses.</p> <p>3) Inspect all the power lines.</p> <p>4) Inspect all the transmission & distribution lines, water sources and reservoirs.</p> <p>5) Report to the Team Leader and to the Team Adviser the status of the office building & the whole system.</p> |

Chapter IV- Human Induced Hazards

Human made or induced hazards are threats having elements of human intent, negligence, error and involving a failure of a system. Human induced disasters are a result of inadequately managed human induced hazards such as Technological Hazards, Environmental Hazards and Socio, Economic, Political, Security Hazards.

Technological hazards have little or no warning to precede the incident. These dangers originate from industrial accidents, dangerous procedures, infrastructure failures or certain human activities, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Some of the technological hazards which are discussed in this Manual are structure collapse, fire, vehicular related accidents, chemical spill, electrical black out/massive power failure, food poisoning and system failure.

Environmental hazards are events that pose a threat from the surrounding environment encompassing the broad spectrum of acute and chronic effects of industrial, agricultural and naturally occurring microorganisms, chemicals and radiation in our soil, water, air, food and wastes. Some environmental hazards included in this Manual are red tide and water pollution.

Socio-economic, political, security hazards are caused by criminal and human violence which pose threat to the security of a great number of people, and may be motivated by political or economic reasons. Some of these are robbery, bomb threats/explosion, kidnapping threats, civil disorder, work stoppage, theft, terrorists attack/sabotage, suicide/death within the premises, misinformation and scandal.

In this Manual these human induced hazards are categorized as Non-Water Supply Service Hazards/Disaster. These will not only affect the provision of water supply but will potentially harm or distort the public image of the Catbalogan Water District and the goodwill that it has established, or put to risk the health and life of its employees and concessionaires.

| Human Induced Disasters | Description | Potential Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|-------------------------|--|---|---|--|---|
| 1.) Structure Collapse | A Structure collapse refers to the failure of a structure or component to maintain its structural integrity. Structures that could collapse include buildings, bridges, and trenches. In addition to collapses caused by problems with engineering or safety measures, structural collapse can be caused by the application of external factors such as earthquakes, fire, and weather-related events. Structural collapse may also be caused by external human action against the structure, such as an accidental vehicular impact or explosion. | <ol style="list-style-type: none"> 1. Injuries 2. Fatalities 3. Psychological Damage 4. Economic Consequences 5. Water Supply interruption 6. Loss of good reputation | <ol style="list-style-type: none"> 1) Conduct inspection of the office building, pump stations & reservoirs. 2) CWDDRRMT recommends the abandonment of structures upon recommendations of authorities, if necessary. 3) Prepare Program of Work for the repair or rehabilitation of structures. | <ol style="list-style-type: none"> 1. Apply first aid and in cases of injuries or fatalities or bring the victims to the nearest hospital. 2. Secure the affected area. | <ol style="list-style-type: none"> 1) Assess and evaluate the damaged structures through the help of experts. 2) Report the extent of damages to authorities for proper action. |
| 2) Fire | Fires start when a flammable or a combustible material, in combination with a sufficient quantity of an oxidizer such as oxygen gas or another oxygen-rich compound (though non-oxygen oxidizers exist), is exposed to a source of heat or ambient temperature above the flash point for the fuel/oxidizer mix, and is able to sustain a rate of | <ol style="list-style-type: none"> 1. Possible water interruption. 2. Injuries or fatalities if not properly managed. 3. Economic Consequences 4. Loss of lives and properties | <ol style="list-style-type: none"> 1. Develop building evacuation plans for each of the building & pump stations. 2. Install fire extinguisher & fire alarm in the CWD facilities and pumping stations. 3. Maintain proper signage for fire exits. 4. Insure the building, pump stations, | <ol style="list-style-type: none"> 1. Notify the local Fire Department by calling BFP hotline# 0955-532-2202 2. Upon notifying the Local Fire Dep't, fight the fire (if within the CWD Compound) ONLY if it is small fire to avoid its spreading to other areas using the available Fire | <ol style="list-style-type: none"> 1) Conduct head count of personnel. 2) Seek medical assistance for the injured if any. 3) Coordinate with the BFP for the assessment of the damage. 4) Conduct inventory of equipment, fixtures & facilities. 5) Prepare incident report. |

| Human Induced Disasters | Description | Potential Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|-------------------------|--|--------------------------|--|---|---|
| | <p>rapid oxidation that produces a chain reaction. Inhaling harmful smoke from the fire can inflame your lungs and airway, causing them to swell and block oxygen. This can lead to acute respiratory distress syndrome and respiratory failure. Smoke inhalation commonly happens when you get trapped in a contained area, such as a kitchen or home, near a fire.</p> | | <p>reservoirs & other properties of the CWD.</p> <p>5. Requests the BFP for their assistance in the conduct of fire & earthquake drills.</p> | <p>Extinguishers (Type ABC)</p> <p>3. Notify the Senior Officers</p> <p>4. Activate the Emergency Response Team</p> <p>5. Identify & neutralize Risks, if possible before proceeding</p> <p>6. Assess the situation to determine the need to remove and relocate valuable things machineries and other equipment.</p> <p>7. Prepare the Removal and Transportation to a safe location preferably open spaces & far from the affected area, which shall remain until the declaration from an authorized authority that Fire is under control. Ensure that authorized CWD Personnel would manned it at all times.</p> | <p>6) Stay out from the damaged building and/ pumping stations until BFP declared it is safe to re-enter.</p> |

| Human Induced Disasters | Description | Potential Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|-----------------------------------|--|--|---|---|---|
| 3) Vehicular Accident | <p>The CWD has several service vehicles used by field personnel attending maintenance & other service requests, meter reading and other office personnel on official travel/business.</p> <p>This presents certain risks to the employees' safety. Potential dangers happen especially when board & alight from the service vehicles & even during transporting/driving.</p> | <ol style="list-style-type: none"> 1) Damage to property. 2) Physical injuries. 3) Inconvenience to third party. | <ol style="list-style-type: none"> 1) Conduct periodic preventive maintenance. 2) Observe traffic rules, drive safely with caution and practice road courtesy. 3) Stay alert while driving. 4) Always wear safety helmet (for single motorcycles). | <ol style="list-style-type: none"> 1) Apply first aid & bring to the nearest hospital the injured employees if necessary. 2) Check the medical record & contact persons of the employees in their IDs. 3) Report the incident to the Police station. | <ol style="list-style-type: none"> 1) Assess the damage of the service vehicle and the driver including passengers and third party, if any. 2) Immediately repair the damaged vehicle. |
| 4) Electric or Power Interruption | <p>It is a short or long term loss of the electric power covering a very wide area.</p> | <ol style="list-style-type: none"> 1) Total or partial disruption of water supply. 2) Disruption of collection of water bills and other payments at CWD office. 3) Interruption of office activities. | <ol style="list-style-type: none"> 1) Make sure that there is enough stock of fuel in all the pumping stations and office. 2) Check the generator sets if they are in good condition. 3) For scheduled power interruptions, prepare advisory informing the consumers to store/stock water. 4) Install emergency lightings in conspicuous place. | <ol style="list-style-type: none"> 1) Make sure that the operators on duty is checking the fuel oil and lubricant before operating the genset. 2) Record the operation time of the generator set including fuels consumed. | <ol style="list-style-type: none"> 1) Ensure that the genset is off before switching to Samelco II power. 2) Check electrical outlets & switches. 3) Record pertinent data in the log book for future reference. |

| Human Induced Disasters | Description | Potential Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|-------------------------|--|---|---|---|---|
| | | | 5) Keep flashlights in accessible places. | | |
| 5) Water System Failure | This happens when there is a sabotage in our pipe network (i.e. intentional damage to the transmission and distribution line and chemical sabotage at source) | 1) Total or partial disruption of water supply. | 1) Conduct periodic inspection of transmission and distribution line and water sources. 2) Provide incentive to the informants of any sabotage done. 3) File legal sanctions to the offenders. | 1) Announce to the consumers the situation and provide measures to mitigate inconveniences. 2) Repair the water system immediately. 3) Take all precautionary measures during repair. | 1) Assess the damage and report to proper authorities. 2) Record the damage and the repair which was done for future reference. 3) Document all the proceedings for submission to proper authorities. 4) Announce to the public the resumption of the service. |
| 6) Theft/Robbery | Theft is the taking of another person's property without that person's permission or knowledge with the intent to deprive the rightful owner of it. Robbery is the crime of taking or attempting to take something of value by force or threat of force or by | 1) Panic among employees & consumers within the premises of the CWD. 2) Loss of cash and properties. 3) Injury or possibly death. | 1) Tighten security measures by installing guard or CCTV at the office. 2) Employ precautionary strategies such as keys. 3) Be vigilant about the safety of everyone. 4) Keep safe storage of personal belongings. | 1) Activate alarm. 2) Report to proper authorities. 3) Listen to the advice of the Police & other authorities. 4) Be cautious while the robbers are still inside the building. | 1) Bring the victim to the hospital for medical check-up/ psychological-social counselling if any. 2) Support the employee in seeking justice. 3) Assess the amount taken by the robber. 4) Convene with proper authorities on what to do |

| Human Induced Disasters | Description | Potential Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|------------------------------------|--|--|---|---|--|
| | <p>putting the victim in fear. Among the types of robbery is armed robbery involving the use of weapon.</p> | | <p>5) Record all the properties of the CWD. 6) Provide warning signs that unauthorized persons are not allowed to enter the teller/cashier's booth and storage room/warehouse. 7) Conduct annual physical count of the properties of the CWD.</p> | <p>5) Keep the evidence and document everything.</p> | <p>& how to solve the problem. 5) Conduct physical count of the properties of the CWD. 6) File legal sanctions to offenders.</p> |
| <p>7) Bomb Threat/ Explosions.</p> | <p>A bomb threat is generally defined as a threat, usually verbal or written, to detonate an explosive or combustible device to cause property damage, death or injuries, whether or not such a device actually exists.</p> <p>Explosion is a violent release of energy that may cause injury and/or damage to property.</p> | <p>1) Panic among employees & consumers within the premises of the CWD. 2) Injury or possibly death. 3) Damage to facilities 4) Water service interruption</p> | <p>1) Encourage employees to be constantly aware of bomb threats and emergency plan. 2) Provide security or CCTV camera for the protection of employees, property, facilities & materials against unauthorized entry.</p> | <p>1) Treat all bomb threats received as real & report immediately to authorities. 2) Remain calm & cautious. 3) Try to obtain as much information as possible as to: the identity of the caller. 4) Ask the exact location of the bomb 5) Immediately evacuate personnel in an orderly manner 6) Report all details to the authorized agency (bomb</p> | <p>1) Request proper authorities to search the building or pumping stations, reservoirs immediately & thoroughly. 2) Strictly implement security measures within the premises. 3) Conduct post incident stress debriefing, if necessary.</p> |

| Human Induced Disasters | Description | Potential Effects on CWD | Prevention, Mitigation & Preparedness (What to do before?) | Response (What to do during?) | Recovery & Rehabilitation (What to do after?) |
|-------------------------|--|------------------------------|---|---|---|
| | | | | disposal unit) immediately | |
| 8) Work Stoppage | Mass refusal of employees to work usually taking place as a result of unresolved employee grievance. | 1) Interruption of services. | 1) Conduct consultative meeting with employees on the grievances 2) Provide Operations Manual to officers & employees to know their responsibilities & what the CWD expects to do & act. 3) Provide seminars on employees' rights & privileges & Values on Work. 4) Implement work rotation for all employees to be familiarized with all kinds of jobs. | 1) Implement work rotation & multi-tasking. 2) Activate grievance committee to have a dialogue with the representative of the employees' association/ union. 3) Make amicable settlements with win-win solutions. | 1) Document all the proceedings for future reference. |

Chapter V – Alert Levels

For purpose of the declaration of crisis level, it shall be categorized as water supply service crisis or non-water supply service crisis.

5.1 Alert Levels- Water Supply Service Crisis

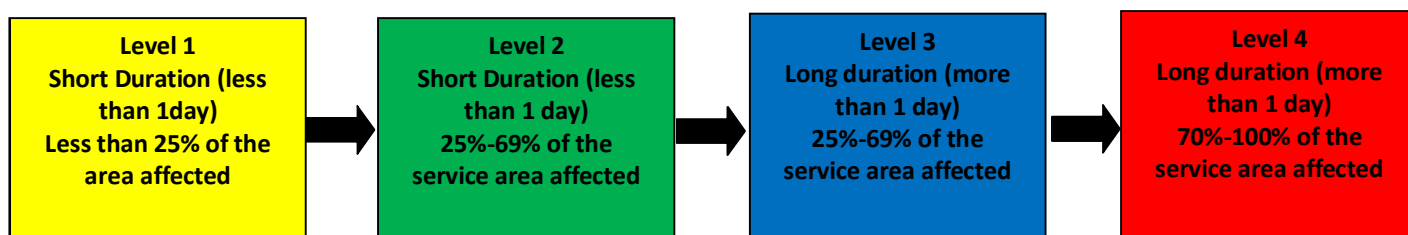
A water supply service crisis that would necessitate the activation and execution of this CWDDRRMP will be based on the severity of damage to its capability to supply its service area. Such damage to be measured based on duration of non-delivery of service and the extent of affected area where:

Level 1 – Classified as short duration of crisis situation (less than one day) and with less than 25% of the service area affected, or that which may result to easily-managed and controlled damage or effect.

Level 2 – Classified as short duration of crisis situation (less than one day) and with 25%-69% of the service area affected, or that which may result to significant but manageable damage or effect.

Level 3 – Classified as long duration of crisis situation (more than one day) and with 25%-69% service area affected, or that which may result to significant and more complicated management of the damage or effect.

Level 4 – Classified as long duration of crisis (more than one day) and with 70%-100% of the service area affected, or that which may result to substantial and catastrophic damage or effect to the facilities.



In case of gradual onset of emergencies as in typhoons and slow-rising floods, alert levels may be declared by the CWDDRRMT in order to take appropriate measures and address potential effects of the phenomenon in question.

In Level 1 Crisis (Yellow warning), information dissemination shall be confined within the affected area, including the barangay covering the area.

In Level 2 Crisis (Green warning), information dissemination shall be confined within the affected area but the Early Warning Team shall immediately monitor news, blogs and other websites for updates. The Rescue and Recovery Team shall provide updated information to the Early Warning Team.

In Level 3 Crisis (Blue warning), information dissemination shall be confined within the affected area but the Early Warning Team shall immediately monitor news, blogs and other websites for updates. It shall also be prepared to set up media station anytime. The Rescue and Evacuation Team shall provide information to Early Warning Team on the progress of service restoration and delivery.

In Level 4 Crisis (Red warning), information dissemination shall be confined within the affected area but the Early Warning Team shall immediately monitor news, blogs and other websites for updates. It shall at once develop, in coordination with the Rescue and Recovery Team, the official statement that will be relayed to the officers, employees and to the consumers. The Rescue and Recovery Team shall likewise provide updated information to the Early Warning Team on the progress of service restoration and delivery.

5.2. Alert Level of Non-Water Supply Service Crisis

All Non-Water Supply Service crisis shall be given the following codes:

- a) Code Violet – where the crisis situation is confined to a limited area. It indicates the need to stay put and “lock down” behind closed or locked doors.
- b) Code Orange – where the crisis situation disrupts all or a large part of the functions of the Catbalogan Water District or endangers the health and safety of its employees or its consumers. Code Orange indicates the need for evacuation.

Chapter VI- CWDDRRMP Framework

The CWDDRRMP is aligned with the NDRRM Plan pursuant to Republic Act 10121 otherwise known as the Philippine Disaster Risk Reduction and Management Act of 2010.

The CWDDRRMP serves as a road map on how disaster risk reduction and management will contribute to the attainment of sustainable development, build the adaptive capacities of communities, increase the resilience of vulnerable sectors and optimize mitigation opportunities with the end view of promoting people's welfare and security towards gender-responsive and rights based sustainable development.

The CWDDRRMP just like the NDRRMMP is also anchored on Hyogo Framework for Action (HFA). The Hyogo Framework for Action (HFA) was the global blueprint for disaster risk reduction efforts between 2005 and 2015. The HFA was adopted in 2005 at the World Conference on Disaster Reduction, held in Kobe, Hyogo, Japan. Its goal was to substantially reduce disaster losses by 2015 - in lives, and in the social, economic, and environmental assets of communities and countries. The HFA is comprehensive, action-oriented response to international concern about the growing impacts of disasters on individuals, communities and national development.

| Hyogo Framework for Action priorities for action | |
|---|---|
| 1 | Make Disaster Risk Reduction a Priority |
| | Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation |
| 2 | Know the Risks and Take Action |
| | Identify, assess, and monitor disaster risks – and enhance early warning |
| 3 | Build Understanding and Awareness |
| | Use knowledge, innovation, and education to build a culture of safety and resilience at all levels |
| 4 | Reduce Risk |
| | Reduce the underlying risk factors |
| 5 | Be prepared and Ready to Act |
| | Strengthen disaster preparedness for effective response at all levels |

Chapter VII – CWDDRRMP Proposed Plans and Projects

The CWDDRRMP proposed priority plans and projects for the years 2021-2026 were formulated by the CWDDRRMT for each of the 4 pillar to wit:

1. Disaster Prevention and Mitigation

- a) Review and integration of CWDDRRM/CCA policies in the CWD policies, plans and budgets.
- b) Recommend resolution for calamity/trust fund
- c) Conduct trainings and seminars, workshops on capacity building
- d) Conduct risk analysis and vulnerability assessment
- e) Conduct tree planting activity
- f) Request updated hazards maps from DENR or concerned agency
- g) Install warning and forecasting system
- h) Periodic updating of the CWDDRRM Manual
- i) Promote the CWDDRRM Manual to all employees, consumers and other agencies.

2. Disaster Preparedness

- a) Establish the guides/protocols for CWDDRRMT
- b) Conduct regular and periodic drills and simulation exercises
- c) Integrate CWDDRRM during activity of the officers and employees
- d) Conduct capacity building and CWDDRRM Skills training
- e) Establish of Emergency Response Teams at all sections
- f) Install early warning systems, disaster command, and communication centers.
- g) Conduct inventory of existing resources.
- h) Evaluate the existing systems.
- i) Purchase CCTV cameras
- j) Purchase emergency rescue equipment / first aid kit/medicine
- k) Stockpile basic commodities or relief goods
- l) Formulate guidelines for the preparation and distribution of relief goods.
- m) Strictly implement RA 10121 and CCA RA 9729

3. Disaster Response

- a) Activate Incident Command System
- b) Deployment of Rescue and Evacuation Team
- c) Submission of Disaster Report to the CWDDRRMT Team Leader and to the Team Adviser
- d) Repack and distribution of relief goods

- e) Deployment of Assessment and Needs Analysis Team
- f) Conduct of coordination meeting
- g) Conduct clearing operations
- h) Establishment of first aid tents
- i) Assessment of factors to determine transition to recovery/rehabilitation phase
- j) Profiling of damaged properties, equipment, machineries and facilities

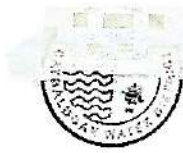
4. Disaster Rehabilitation and Recovery

- a) Assessment of damaged properties, equipment, machineries and facilities
- b) Repair and rehabilitation of damages
- c) Improvement/renovation of facilities and procurement of equipment
- d) Construction and repair of major infrastructures
- e) Construction/repair/rehabilitation of the systems
- f) Conduct stress debriefing

Annex I

BOD Resolution No. 56, series of 2018

***Resolution Approving the Policy of Safeguarding and
Securing Chemicals, Equipment and other Combustible
Materials of the District***



CATBALOGAN WATER DISTRICT
Catbalogan, Samar

OFFICE OF THE BOARD OF DIRECTORS

Board Resolution No. 56
Series of 2018

SUBJECT:

**APPROVING THE POLICY OF SAFEGUARDING AND SECURING
CHEMICALS, EQUIPMENT AND OTHER COMBUSTIBLE MATERIALS OF
THE DISTRICT**

WHEREAS, Management hereby recommends for board approval the policy of Safeguarding and Securing Chemicals, Equipment and other Combustible Materials of the district,

WHEREAS, in case of calamities, natural and man-made; any unforeseen events that may cause imminent danger to life and property or any other cases where immediate action is necessary to prevent damage to or loss of life or property, the three (3) Division Managers shall be the immediate responsible person to act or respond to avoid untoward incident or minimize the impact to vital public service,

WHEREAS, each division shall assign 6 – 7 personnel responsible in securing such chemicals and other combustible materials including equipment to a safe area outside the CWD premises,

WHEREAS, the Administrative Division shall orient the Security Guard-on-Duty during such calamities/event on what to do and whom to call for proper guidance and measures for execution or implementation,

WHEREAS, the Engineering Division shall make the necessary ocular inspection to determine the appropriate location for the chemicals including the preparation of Program of Work for the Proposed Chemicals Storage Room,

WHEREAS, Management shall prepare the Implementing Rules and Regulations (IRR) 15-days after the approval of this Policy,


NOW THEREFORE, as unanimously moved and seconded by the members of the Board present,


RESOLVED, as it is hereby resolved, approving the policy of Safeguarding and Securing Chemicals, Equipment and other Combustible Materials of the district.

Adopted this 26th day of June 2018.


JOSE A. MABULAY, JR.
Vice Chairman


ROLANDO T. KO
Director


VICTORIANO C. NAVARRETE
Chairman


MYRA GAY M. TAMBOR
Secretary/Treasurer


PEDRITO G. PADILLA
Director

Annex J
Implementing Rules and Regulations of BOD No. 56,
series of 2018

*Policy of Safeguarding and Securing Chemicals,
Equipment and other Combustible Materials for the
District*

CATBALOGAN WATER DISTRICT
Catbalogan City

SUBJECT
IMPLEMENTING RULES AND REGULATIONS OF BOD RESOLUTION NO. 56,
SERIES OF 2018

Pursuant to the BOD Resolution No. 56, series of 2018, otherwise known as the “**Policy of Safeguarding and Securing Chemicals, Equipment and other Combustible Materials of the District**”, the Catbalogan Water District hereby adopts and promulgates the following Rules and Regulations.

PART I GENERAL PROVISIONS

RULE I. PRELIMINARY PROVISIONS

Section 1. Title

These Rules shall be known and cited as the “**Implementing Rules and Regulations of Safeguarding and Securing Chemicals, Equipment and other Combustible Materials of the District.**”

Section 2. Purpose

These Rules are promulgated to prescribe the procedures and guidelines for the implementation of safeguarding and securing various disinfection agents/chemicals (Chlorine, PolyAluminum Chloride and Polymer), Equipment and other Combustible Materials in order to facilitate compliance therewith and achieve the objectives thereof.

Section 3. Scope

These Rules shall lay down the functions and responsibilities of the Division Heads, and its duly authorized representative and all other concerned personnel; the ways and means for the execution of all the precautionary measures to minimize and/or prevent any untoward incident that may cause imminent danger to life and property with respect to the implementation of this Policy.

Section 4. Construction

These Implementing Rules and Regulations shall be liberally construed to carry out the district policy of adopting a systematic and comprehensive emergency response in pursuit of public safety.

Section 5. Administrative and Enforcement

These Rules and Regulations shall be administered by the Head of the Agency or his duly authorized representative to direct, provide assistance in the form of personnel, facilities and other resources as the need arises in the discharge of its functions and responsibilities.

RULE II. DECLARATION OF DISTRICT POLICY

Section 1. Declaration of Policies

It is the policy of the District to adopt a systematic and comprehensive emergency response in pursuit of public safety which shall:

- a) Ensure the safety and protection of public and the environment;
- b) Utilize environmentally-sound methods that maximize the utilization of valuable resources and encourage resources conservation and recovery;
- c) Ensure the fast and proper transport of chemicals, equipment and other combustible materials to a safe location; and
- d) Ensure that both, personnel and the public are aware of the hazards it may cause.

RULE III. DEFINITION OF TERMS

Section 1. Terminologies

For the purpose of these Implementing Rules and Regulations, the following terms and phrases shall have the following meanings:

- 1.) Safeguarding – to protect, preserve, conserve, save, secure, shield, guard, and keep safe something or someone from being harmed or lost.
- 2.) Securing – to make certain something or someone is protected from danger or risk.
- 3.) Chemicals – a compound or substance that has been purified or prepared.
- 4.) Equipment – are various fuel-operated equipment or devices in specific work operation.
- 5.) Combustible Materials – capable of catching fire and burning, inflammable; materials that will ignite and burn or will add appreciable heat to an ambient fire.
- 6.) Chlorine – chemicals used to kill certain bacteria and other microbes in tap water as it is highly toxic, in particular, to prevent the spread of waterborne diseases.
- 7.) PolyAluminum Chloride (PAC) – chemicals used as a flocculant in water purification, in treatment of drinking/potable water.
- 8.) Polymer – chemicals used to coagulate suspended solids and produce large curds of solid materials (floc); floc builders.
- 9.) Precautionary Measures – are actions taken in order to prevent something dangerous or unpleasant from happening; measures taken beforehand to prevent harm.
- 10.) Resources – a stock of supply of money/funds, materials, staff/personnel, and other assets that can be drawn on by a person or organization in order to function or operate effectively.
- 11.) Hazard – an unavoidable danger or risk, even though often foreseeable; something that could be dangerous to public safety and health.
- 12.) Fire Extinguisher – a portable device used to extinguish or control small fires, often in emergency situations, and are usually has three (3) types or combination
 - Type A – are used on Paper, Wood, Plastics, Fabric, Rubber, Trash
 - Type B – are used on Gasoline, Oil, Grease, Some Paints & Solvents
 - Type C – Energized Electrical Equipment, Appliances, Computers, Circuit Breakers, Wiring
- 13.) Toxicological Characters – a toxic quality of substance/chemicals that has an adverse effect on humans or environment, especially when above its safe level of exposure.
- 14.) Chemical Reactivity – is the tendency of a substance to undergo chemical changes or reaction, either by itself or with other materials.

PART II STRUCTURES AND MECHANISMS

RULE IV. OVERSIGHT ARRANGEMENTS

Section 1. Functions and Responsibilities of the Emergency Response Team (ERT)

An Emergency Response Team (ERT), and under the Office of the General Manager, is hereby established. The Team is tasked to spearhead and oversee the implementation of plans and procedures to achieve the objectives of the Policy. The Team shall undertake the following activities:

- a) Prepare the Emergency Response Flow Chart;
- b) Monitor the construction and implementation phase of the CCM Storage Room (Chemicals & Combustible Materials) and ensuring that same is in accordance with the standard specifications (Plans & Drawings, and Materials)
- c) Review and monitor the implementation of safety and safeguarding plans and procedures;
- d) Coordinate the operation, plans and procedures with Catbalogan LGU; concerned agencies/organizations, and other respondents;
- e) Identify specific relocation sites, preferably open spaces; and
- f) To the maximum extent feasible, utilizing existing resources for the preparation and implementation of plans and procedures.

Section 2. Composition and Membership of the Emergency Response Team (ERT)

The Team shall be composed of one (1) Team Leader (General Manager); three (3) Asst. Team Leaders (Division Heads); and seven (7) team members from the three (3) Divisions (Engineering, Commercial and Administrative).

In addition, the Team Leader shall create additional respondents committees that shall immediately respond to the emergency situation, such as **First-Aid Committee, Rescue Committee, and Fire-Fighting Committee.**

RULE V. SUPPORT MECHANISMS

The first person on-scene will typically serve as the Incident Commander (IC), until relieved by a more senior person. Responsibilities for the first person on-scene may include:

- a.) Taking appropriate personal protective measures
- b.) Notifying the General Manager and/or Division Managers of the incident
- c.) Advising public in the vicinity or affected area of any potential threat and/or initiate evacuation procedures
- d.) Eliminate potential ignition sources/combustible materials.

Section 1. Role of the Team Leader

The Team Head shall specifically perform the following functions:

- a) Activate the Emergency Response Team
- b) Provide specific trainings to ERT, and Committees to effectively respond to emergency cases or situations
- c) Activate additional local respondents
- d) Evaluate the severity, potential impact, safety concerns, and response requirements based on the initial information provided by the First Person On-Scene
- e) Confirm safety aspect at site, including for personal protective equipment, sources of ignition, and potential need for evacuation.
- f) Communicate and provide incident briefings to supervisory personnel, as appropriate.
- g) Communicate with the Emergency Response Team, as the situation demands
- h) Direct response on cleanup operations
- i) Provide all the available resources necessary for the team and other respondents to effectively respond.

Section 2. Functions of the Asst. Team Leaders

The following shall be the general functions of the three (3) Asst. Team Leaders:

- a.) Initiate initial response action if he/she is the first person on the scene (see above)
- b.) Restrict access to the incident scene and surrounding area as the situation demands. Take any other steps necessary to minimize any threat to health and safety.
- c.) Request medical assistance, if necessary
- d.) Coordinate further response actions with Team Head and other local respondents.
- e.) Assign personnel to respond during emergencies and calamities;
- f.) Prepare all the resources necessary for the implementation;
- g.) Record and document all the proceedings for future reference; and
- h.) Perform all other functions as may be deemed necessary by the Team Head.

Section 3. Role of the Team Members

For the furtherance of the objectives of the Policy, the Members shall have the following functions:

- a) Provide immediate support and assistance
- b) Recommend procedures for smooth implementation of the procedures;
- c) Recommend measures and processes to eliminate and/or minimize obstructions to smoothly execution of actions; and
- d) Perform such other functions necessary to achieve the objectives of this Policy.

Section 4. Role of the Committees

- a) **First-Aid Committee** - Provide emergency aid or treatment to any person suffering from sudden illness or injury before regular medical services arrived or reached.
- b) **Rescue Committee** – Provide support and assistance in the search and rescue operation for any potential victims. Provide assistance in assessing the potential hazards. Determines hazard controls and emergency contingency plans and ensures that required safety equipment and PPE are readily available and in good working order.
- c) **Fire-Fighting Committee** – Provide immediate respond during fire emergencies until the arrival of the local BFP and other concerned respondents to prevent or minimize the risks.

RULE VI. COLLECTION, TRANSPORT AND HANDLING

Section 1. Minimum standards for the collection, transport and handling of Chemicals and other Combustible Materials

One of the greatest hazards associated with the use of chlorine is that, it is potentially dangerous. These are attributable to its toxicological character, physical properties, and chemical reactivity.

It is important that personnel engaged in any activity involving handling of chemicals or other disinfection agents such as Chlorine, Polyaluminum Chloride and Polymer should know and recognize the risks and should have a good understanding of the basis of preventive measures. This will make them more conscious about safety which would be achieved if they are trained to follow certain instructions.

The following shall be the minimum standards and requirements for the collection, transport and handling of Chemicals and other Combustible Materials:

- a.) All members/collectors and other personnel directly dealing with collection, transport and handling of chemicals and other combustible materials shall be equipped with personal protective equipment and paraphernalia such as, but not limited to gloves, masks and safety boots, to protect them from the hazards of handling of such materials.
- b) The District shall provide necessary training to all concerned personnel to ensure that the chemicals and other combustible materials are handled and transported properly. The District shall likewise provide trainings to all Committee Members to deliver their duties and responsibilities more effectively.
- c) Collection, Transport and Handling of chemicals and other combustible materials shall be done in a manner that prevents damage to the container and spillage or scattering of such materials within the collection vicinity (storage room and relocation site);
- d) The equipment used in the collection and transportation of such materials shall be operated and maintained in good condition;
- e.) The container used in the collection and transport of chemicals and other combustible materials shall be appropriately cover to ensure its containment while in transit;
- f.) For the purpose of identification, the container shall be properly labeled; and
- g.) In the event of Fire and other calamities, natural & man-made, all members & other concerned personnel shall strictly follow the emergency response procedures herein stated.

Section 2. Minimum Standards for Storage Room, Handling, Storage, Transportation and Relocation of Powdered or Granular Chlorine

Section 2.1 Storage Room

- a.) Children and animals must at all times prohibited near the storage room;
- b.) Only qualified and authorized personnel are permitted to enter the area/room;
- c.) It must have adequate ventilation. Basically, a cool, dry place with plenty of air circulation;
- d.) Doors should not be self-locking and must open outwards;
- e.) Flooring must be properly elevated; and
- f.) It must be strategically located near the exit (gate), with no obstruction, and far from any possible sources of heat (welding shop)

Section 2.2. Handling

- a.) Use a separate, clean and dry measuring cup for Granular Chlorine;
- b.) Clean and wipe out any residue or spillage; and
- c.) Ensure that containers are properly and tightly closed right after withdrawal.

Section 2.3. Storage

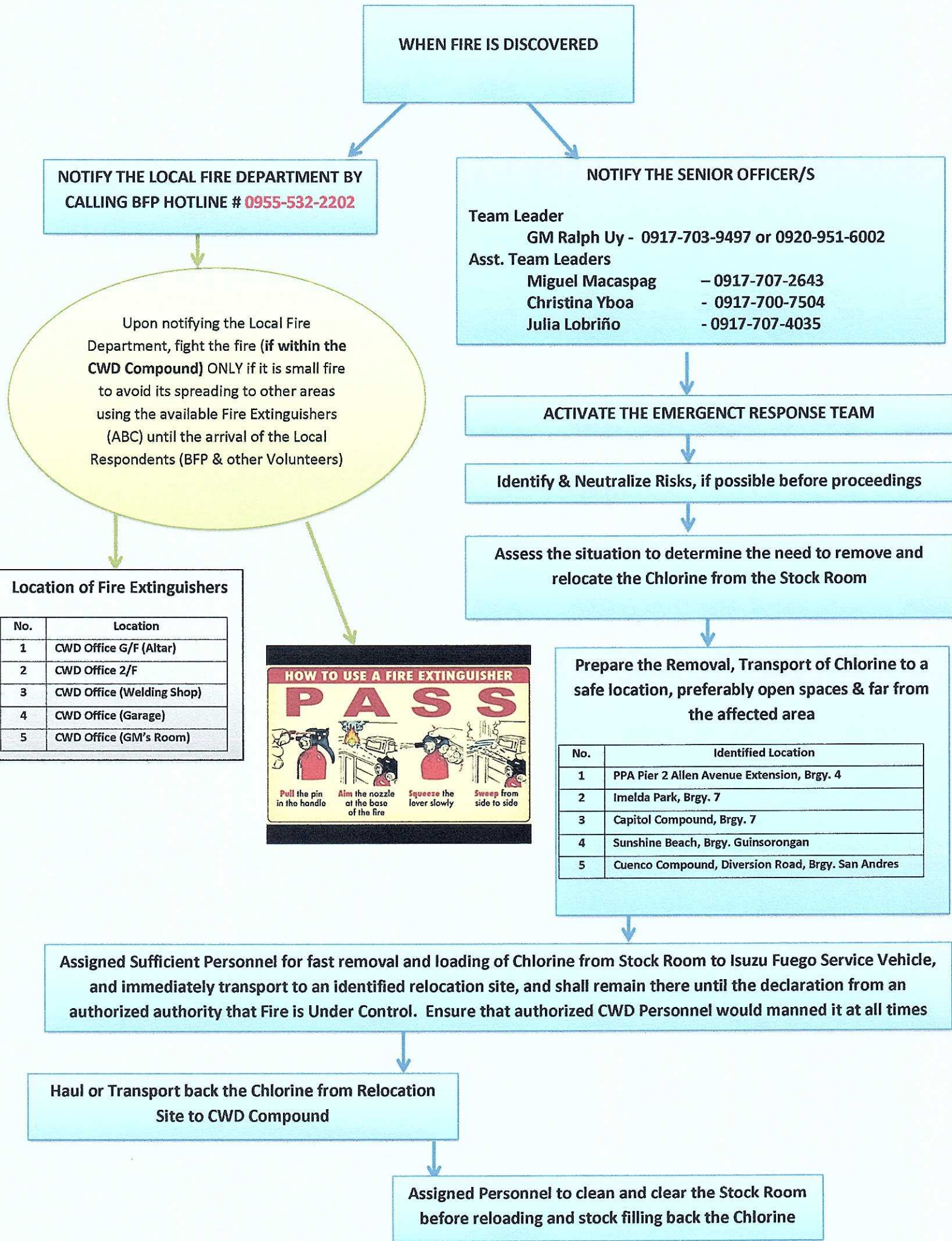
- a.) Store separately from other chemicals, flammables, acid, grease, oil and other lubricants;
- b.) Store containers/drums in an upright position, and must be securely closed;
- c.) Containers must be stored with enough room between them to allow complete accessibility during emergencies;
- d.) Store and use Chlorine in a first-in, first-out basis; and
- e.) Separate empty from full containers;

Section 2.4. Transportation and Relocation

- a.) In case of fire and other calamities, relocation of Chlorine shall be the utmost priority;
- b.) The First-Person-on-Site shall ensure that entrance and exits are free from any obstruction;
- c.) The First-Person-on-Site shall also ensure that the Local Fire Department and Emergency Response Team were properly notified;
- d.) Team Leader/Asst. Team Leaders shall ensure that Isuzu (Fuego and Elf) Service Vehicles are in working and running condition;
- e.) Asst. Team Leaders or their authorized representatives shall ensure that safety precautions and handling of Chlorine from Storage Room to service vehicle up to the identified relocation area, preferably open spaces are strictly followed;
- f.) Ensure that all containers are tightly sealed/closed to ensure that no spillage during transit;
- g.) Ensure that personnel in-charge shall be at all times ensures the safety of Chlorines from any type pilferages, damage to containers, contamination and/or moistening (due to firefighting, etc.); and
- h.) Ensure that Storage Room are properly cleaned and dried before hauling back and restoring the Chlorine.

Section 2.5. Emergency Response Flow Chart for Safekeeping, Transportation & Relocation of Granular Chlorine during Fire

**EMERGENCY RESPONSE FLOW CHART DURING FIRE
(TRANSPORTATION AND RELOCATION OF GRANULAR CHLORINE)**



WHEN FIRE IS DISCOVERED

NOTIFY THE LOCAL FIRE DEPARTMENT BY CALLING BFP HOTLINE # 0955-532-2202

Upon notifying the Local Fire Department, fight the fire (if within the CWD Compound) ONLY if it is small fire to avoid its spreading to other areas using the available Fire Extinguishers (ABC) until the arrival of the Local Respondents (BFP & other Volunteers)

NOTIFY THE SENIOR OFFICER/S

Team Leader
GM Ralph Uy - 0917-703-9497 or 0920-951-6002

Asst. Team Leaders
Miguel Macaspag - 0917-707-2643
Christina Yboa - 0917-700-7504
Julia Lobriño - 0917-707-4035

ACTIVATE THE EMERGENCT RESPONSE TEAM

Identify & Neutralize Risks, if possible before proceedings

Assess the situation to determine the need to remove and relocate the Chlorine from the Stock Room

Location of Fire Extinguishers

| No. | Location |
|-----|---------------------------|
| 1 | CWD Office G/F (Altar) |
| 2 | CWD Office 2/F |
| 3 | CWD Office (Welding Shop) |
| 4 | CWD Office (Garage) |
| 5 | CWD Office (GM's Room) |



Prepare the Removal, Transport of Chlorine to a safe location, preferably open spaces & far from the affected area

| No. | Identified Location |
|-----|---|
| 1 | PPA Pier 2 Allen Avenue Extension, Brgy. 4 |
| 2 | Imelda Park, Brgy. 7 |
| 3 | Capitol Compound, Brgy. 7 |
| 4 | Sunshine Beach, Brgy. Guinsorongan |
| 5 | Cuenco Compound, Diversion Road, Brgy. San Andres |

Assigned Sufficient Personnel for fast removal and loading of Chlorine from Stock Room to Isuzu Fuego Service Vehicle, and immediately transport to an identified relocation site, and shall remain there until the declaration from an authorized authority that Fire is Under Control. Ensure that authorized CWD Personnel would manned it at all times

Haul or Transport back the Chlorine from Relocation Site to CWD Compound

Assigned Personnel to clean and clear the Stock Room before reloading and stock filling back the Chlorine

PART III. FINAL PROVISIONS

Section 1. Separability Clause

If any section or provision of these Rules and Regulations is held or declared irrelevant, the other sections or provisions hereof shall continue to be in force as if the sections or provisions so annulled or voided had never been incorporated herein.

Section 2. Repealing Clause

All Rules and Regulations or parts of pertinent policies and memoranda inconsistent with these guidelines are hereby revised, amended, modified and/or superseded as the case may be.

Section 3. Amendments

These Rules and Regulations may be amended and/or modified from time to time by the District.

Section 4. Effectivity

These Implementing Rules and Regulations shall take effect upon approval.


ENGR. RALPH S. UY
General Manager/Team Leader

Annex K
Manual on First Aid for Chlorine-Related Injuries

MANUAL (FIRST-AIDE COMMITTEE)

FIRST AID FOR CHLORINE-RELATED INJURIES

When someone is injured in a Chlorine-related incident, first aid can help reduce the impact of their injuries and prevent further injuries from occurring. The following steps apply to any situation in which someone is injured:

- 1.) Do not panic.
- 2.) Ensure that there is no more danger to yourself or the victim.
- 3.) Using appropriate safety gear, remove the victim from the contaminated area.
- 4.) Send for medical help.

Section 1. For Chlorine Inhalation

Someone who has inhaled chlorine may be unconscious, and may have difficulty breathing or may have stopped breathing completely. Follow these steps when treating a victim of chlorine inhalation:

- 1.) Assess the victim's breathing:
 - * If breathing has stopped, begin artificial respiration and continue until the victim resumes breathing. Pocket masks are recommended for artificial respiration, although the mouth-to-mouth method may also be used.
 - * If the victim is having difficulty breathing (for example, gasping or coughing), place the victim in the most comfortable position, usually semi-sitting.
- 2.) If an oxygen therapy unit and trained personnel are available, administer oxygen at a 10-litre flow.
- 3.) Ensure that the victim is transported to hospital in case the victim suffers a delayed reaction in the form of pulmonary edema. Any physical exertion, excitement, or apprehension increases the chance and severity of a delayed reaction. Keep the victim warm and completely at rest. Reassure the victim while waiting for assistance and transportation to hospital.

Section 2. For Skin Contact

Skin contact with chlorine can result in severe burns. Before attempting to flush a victim's contaminated skin, make sure the victim is breathing properly. Follow these steps:

- 1.) Assess the victim's breathing:
 - * If breathing has stopped, begin artificial respiration and continue until the victim resumes breathing. Pocket masks are recommended for artificial respiration, although the mouth-to-mouth method may also be used.
 - If the victim is having difficulty breathing (for example, gasping or coughing), place the victim in the most comfortable position, usually semi-sitting.
- 2.) As soon as the victim resumes breathing, flush the victim's contaminated skin and clothing with large amounts of water for 30 minutes.
- 3.) Remove all contaminated clothing while flushing.
- 4.) Continue flushing until all traces of chlorine have been removed.
- 5.) Dress obvious burns with sterile gauze and bandage them loosely. Apply insulated cold packs to help reduce pain.
- 6.) Get the victim to hospital.

Notes:

1. Do not attempt to neutralize the chlorine with other chemicals.
2. Do not apply salves (cream, lotion or balms), ointments, or medications unless prescribed by a doctor.

Section 3. For Eye Contact

Eye contact with chlorine (liquid or gas) for even a short period can cause permanent disability. Flushing must begin within 10 seconds. Follow these steps:

- 1.) Flush the eyes immediately with large amounts of running water (preferably lukewarm) for 30 minutes. Hold the eyelids forcibly apart to ensure full flushing of the eyes and eyelids.
- 2.) After flushing has removed all traces of chlorine, cover both eyes with moistened sterile gauze pads and bandage, enough to keep light out.
- 3.) Apply insulated cold packs to help reduce pain.
- 4.) Get the victim to hospital.

Notes:

1. Do not attempt to neutralize the chlorine with other chemicals.
2. Do not apply oils, ointments, or medications to the eyes.