SAN JOSE WATER
SAN JOSE DEL MONTE CITY WATER DISTRICT

PrimeWater
SAN JOSE DEL MONTE CITY

Water Safety Plan

DECEMBER 2022 – VERSION 2

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Abstract

The City of San Jose Del Monte is located at the northeast portion of Manila characterized by topography of rolling plains. The city is approximately 42 kilometers away from Manila. Due to its proximity to Metro Manila, the city earned its appellation as the “Balcony of the Metropolis”. The city is largely a resettlement area of the government, thus, the rapid growth in population. At present, the city is divided into two political districts; District1 – the part of the city which is outside Sapang Palay Resettlement Project (SPRP) and District 2 which comprises SPRP.It has a total number of 59 barangays.

Sixty percent (60%) of the city’s water supply comes from San Jose Del Monte City Water District. San Jose del Monte City Water District (San Jose Water) is a government owned-and controlled corporation established on July 22, 1980, by virtue of PD 198, as amended, otherwise known as the Provincial Water Utilities Act of 1973. It belongs to Category A of water districts.

San Jose Water gets its source from surface water and ground water. It has a total length of pipelines laid of 666,597.35 linear meters, traversing the slopes of the city. San Jose Water divided its service area into two parts – “Area”, which is within Sapang Palay Resettlement Project (SPRP) and “Non-Area” which is outside SPRP. Non-Area is composed of barangays outside SPRP and numerous private subdivisions - some of which had their water system turned over to San Jose Water.

It is mandated to provide safe and potable water and sanitation to the residents of the City of San Jose Del Monte, Bulacan. San Jose Water serves all 59 barangays in the city. Ithas 139,488 total number of service connections translating to approximately a population of 697,440; it is the fourth largest water district in the country.

San Jose Water has a total raw water allocation of 80,000 cmd from Metropolitan Waterworks and Sewerage System (MWSS). The allocated raw water supply comes from Angat Dam, which is a multi-purpose dam and is intended for power, irrigation and water supply. To date, San Jose Water gets close to 71,600 cmd raw water from Aqueduct No.6 which passes adjacent to the Water Treatment Plant Compound of San Jose Water and at Grand Cypress Subdivision.

Aside from the allocated raw water from MWSS, San Jose Water also gets treated water from Angat Bulk Water Supply Project (ABWSP) and Bulacan Bulk Water Supply Project (BBWSP). San Jose Water also makes use of 10 deepwell stations located outside SPRP Area.These deepwells have rated capacity of 25 to190 gpm.

To ensure safe and potable water is being delivered to the residents of the city, San Jose Water conducts hourly collection of samples from randomly selected concessionaires for turbidity and chlorine residual testing. Its treatment plants have an online chlorine residual monitoring system.

Once a month, water samples are submitted to DOH-accredited laboratories for bacteriological testing. Water samples are collected at source twice a year for physical and chemical analysis. San Jose Water also guarantees that the water it serves conforms to the standards prescribed by the Philippine National Standards for Drinking Water.

To further improve water quality, San Jose Water signed an agreement with the Korean Water Resources Corporation for a one-year twinning partnership in 2011. The partnership resulted to efficient coagulation with the revision on coagulant dosing line at raw water intake facility, improved sludge treatment system, improved manganese removal capability and stricter water quality monitoring by inclusion of additional parameters such as manganese, alkalinity, color, iron and trihalomethanes.

Last April 1, 2015, San Jose Water implemented Septage Management Project for the City of San Jose Del Monte. The city government passed Ordinance No. 2012-48-11 requiring all owners of residential, commercial, and industrial structures in the city to desludge their septic tanks every five years. This will ensure that septage will be properly collected, treated, and disposed in accordance with the environmental standards. This project will reduce the occurrence of contamination of water ways such as creeks, rivers, and groundwater.

The Water Safety Plan focuses on monitoring the safety of drinking-water supply from its catchment to San Jose Water/Primewater SJDM's concessionaires. This WSP comprises the protection of the water sources, water treatment plants, pumps and reservoirs from risks that will endanger the quality of water being delivered.

The plan covers San Jose Water/Primewater SJDM's water supply and distribution systems in Water Treatment Plants No. 1, 2 and 3, the nine (9) deep well (ground water) stations, Angat Bulk Water Supply System and Bulacan Bulk Water Supply system.

Introduction

The City of San Jose Del Monte covers 10,553 hectares, according to the Land Management Bureau. However, the Local Government Unit (LGU) claims an actual territorial area of 31,294 hectares; this includes the disputed areas with adjacent municipalities. The Angat Watershed Reservation, which has a land area of 18,000 hectares, is partly within the city.

Commercial, residential, and light industrial areas are found all over the city. Currently, it has more than a hundred private subdivisions located in various barangays. There are also at least eight resettlement projects of the National Housing Authority within the City. The biggest of which is the 752 hectares SPRP in Sapang Palay. In between the built-up clusters are pockets of agricultural lands, which are continuously converted into urban uses.

The city is divided into two political districts; District 1 which comprises the 23 barangays outside SPRP and District 2 which comprises the remaining 36 barangays in SPRP.

Based on the city's demographic profile, the City of San Jose del Monte experienced a 3.64% population growth, or an additional population of 138,746 persons from the year 2000. Should the city observe the same growth trends, in 30 years, the city's population would increase by roughly 1.9 million.

The San Jose del Monte City Water District (San Jose Water) is a government owned-and controlled corporation established on July 22, 1980, by virtue of PD 198, as amended, otherwise known as the Provincial Water Utilities Act of 1973. It belongs to Category A of water districts.

San Jose Water started with only 200 service connections carried over from the old municipal waterworks system it replaced. To reach out to the communities not yet served by

regular distribution lines of San Jose Water due to financial and technical limitations at that time, it implemented the Tawid Uhaw Project (TUP) in the early 90's. TUPs are structures made up of two communal metered faucets funded by the local government and civic organizations.

In 1995, San Jose Water was able to secure approval for the implementation of the Comprehensive Water Supply Improvement Project Phase I funded by the French and Philippine governments. In 1997, the P154-milion modern Water Treatment Plant was completed and inaugurated at Bgy. Minuyan.This treatment plant serves mostly the Sapang Palay Resettlement Project Area and processes 20,000 cubic meters of raw water per day from the Angat River.

Early in 2006, San Jose Water started operating its second water treatment plant under the Comprehensive Water Supply Improvement Project Phase II. The Project, amounting to P547 Million is funded by the Japan Bank for International Cooperation (JBIC) through the Local Water Utilities Administration (LWUA). The additional 30,000 cmd of safe drinking water benefited 30,000 households. Included in the project is the construction of another Water Treatment Plant at the WTP Complex at Brgy.Minuyan, Sapang Palay, City of SJDM. Raw water is sourced from the Angat River.

San Jose Water began implementing Angat Bulk Water Supply System Project in 2014 to augment the water requirement of the concessionaires in SPRP area and in Brgy. Muzon – the most populous barangay in the city. Also, a 1,000 cum underground tank was constructed at Bgy.Muzon to serve as additional storage in the area and it became operational December of 2019

In March 2019, San Jose Water/Primewater started withdrawing water from Bulacan Bulk Water Supply. On its initial year, San Jose Water/Primewater started to withdraw 4,000 cum per day. At present, 30,000 cum per day is being withdrawn and augmented water supply at eight (8) brgys. These are Brgys. Tungkong Mangga, San Manuel, Maharlika, Gumaok East, Gumaok Central, Gumaok West, Graceville and Gaya-gaya.

On the last quarter of 2019, San Jose Water/Primewater started its third water treatment plant operation. The project, amounting to Php. 149,411,447.52 was sourced out from its own internal reserve. The additional 10,000 cum per day of safe and potable drinking water directly benefited 10,000 households. Included in the project is the construction of another10 CMD Water Treatment Plant and a 450 cum Cistern Tank to receive water from Aqueduct No. 6 of MWSS. These structures are located at Grand Cypress Subd., Brgy.Tungkong Mangga, CSJDM, Bulacan. Raw water is sourced from the Angat River through Aqueduct No.6.

Still part of its mandate of providing water and sanitation to the city, San Jose Water established its Septage Management Project for the city. City Ordinance No. 2012-48-11 establishing a septage management program for the city was signed by Mayor Reynaldo S. San Pedro last December 4, 2012. The passage of the ordinance is in compliance with the requirement of Clean Water Act which requires LGUs to provide an enabling environment for septage management to preserve the integrity of our water resources, ensure water quality and promote public health. The ordinance authorizes San Jose Water/Primewater to collect and haul septage from domestic, commercial, and industrial establishments in the city. A 60 cmd septage treatment facility was constructed to treat and dispose the effluents according to prevailing environmental standards.

In 2018, another 60 cmd septage treatment plant was constructed and became operational by 2019. The construction ensures the mandate for the adherence of the implementation of five (5) year desludging cycle for each households' septic tank.

With quality and adequacy of its water supply taken care of, San Jose Water/Primewater is now the largest water district in Central and Northern Luzon and the fourth largest in the country. At present, San Jose Water is a Category A Water District. It currently serves all 59 barangays in the city. It has 139,488 service connections translating to approximately a population of 697,440. The 96.9% of San Jose Water's service connections are classified as residential while 2.84% belongs to commercial classification and 0.26% belongs to Government institution.

On February 2018 San Jose del Monte City Water District and PrimeWater-San Jose del Monte City (PW-SJDMC) entered into a Joint Venture Agreement for the financing, development, rehabilitation, improvement, operation, and maintenance of the water supply system and septage management system of San Jose del Monte Water District.

PW-SJDMC has a total number of 225 employees or a ratio of 1:553 per service connection.

Our Vision

Safe and potable water flowing twenty-four hours a day from the tap of every home in the City of San Jose delMonte.

Our Mission

To serve all residents of the City of San Jose del Monte with equitable, reliable and immediate access to safe and potable water twenty-four hours a day at the least possible cost.

As mandated by the Department of Health's Administrative Order 2014-0027 which declares the development and implementation of Water Safety Plan (WSP) by all drinking-water service providers and as required by the Local Water Utilities Administration Memorandum Circular No.010.14, the management of San Jose Water issued a Memorandum Circular dated December 16, 2015 directing team who are experts in water quality monitoring to create and develop a Water Safety Plan.The newly assembled WSP Team mostly come from the Operations and Technical Services Groups.The team underwent rigorous training, workshops, and walkthroughs to identify and assess the hazards and risks that may jeopardize the quality of water being delivered to concessionaires.

The WSP Team conducted periodic meetings and consultations which helped them develop an appropriate Water Safety Plan. Control measures were considered for each identified hazard. The effectiveness of these control measures was validated and was included in the improvement plan.

San Jose Water/PW-SJDMC WSP is in conjunction with its Crisis Management Plan created in 2013. This crisis management plan of San Jose Water/PW-SJDMC aims to ensure, in emergency and disaster situations, the least possible impact on water supply and San Jose Water/PW-SJDMC public image through an effective response that contributes to preserving the health and life of the population.

The WSP on the other hand, focuses on monitoring the safety of water from its source to San Jose Water/PW-SJDMC concessionaires. This WSP comprises the protection of the water sources, water treatment plants, pumps and reservoirs from risks that will endanger the quality of water being delivered to the concessionaires.

Specifically, this plan aims to:

a) Ensure the safe quality of supplied water from its catchment to the tap of every home in the City of San Jose Del Monte.

b) Prevent contamination of water by identifying potential risks and addressing these risks quickly and effectively with appropriate control measures.

c) Provide policies and procedures to maintain quantity and quality of service even during adverse conditions.

d) Facilitate decision-making on critical issues in a potentially stressful environment and define responsibilities and roles during emergency situation.

e) Provide procedures for using the lessons gained following every emergency or unforeseen event to guarantee that every hazard and issue is covered and will not recur in the future.

The plan integrates existing operational crisis response plans managed by individual Departments of San Jose Water/PW-SJDMC. It is considered as a risk management strategy or umbrella which will influence San Jose Water/PW-SJDMC tasks of working towards the continuing supply of safe water. Further, the plan is intended to facilitate organized decision-making in times of crisis and is designed to be used in conjunction with the normal decision-making hierarchy of San Jose Water/PW-SJDMC and does not supplant that decision-making process.

I. THE WATER SAFETY PLAN TEAM

To secure the technical expertise needed to develop this Water Safety Plan, San JoseWater/PW-SJDMC assembled a team of experts in water quality monitoring coming from Operations and Technical Services Groups. The WSP Team was formed through Board Resolution No. 25 Series of 2023 (see attached Annex A) and Joint Office Memorandum No. 2023 - 01 (see attached Annex B) of the Board of Directors and management of San Jose Del Monte City Water District and its joint-venture partner PrimeWater to develop and implement the identified methods connected to the safety of the water supply. These individuals have vast experience in understanding the quality of raw water, its treatment and distribution.

Table 1.1. Skills needed to complete a WSP Team

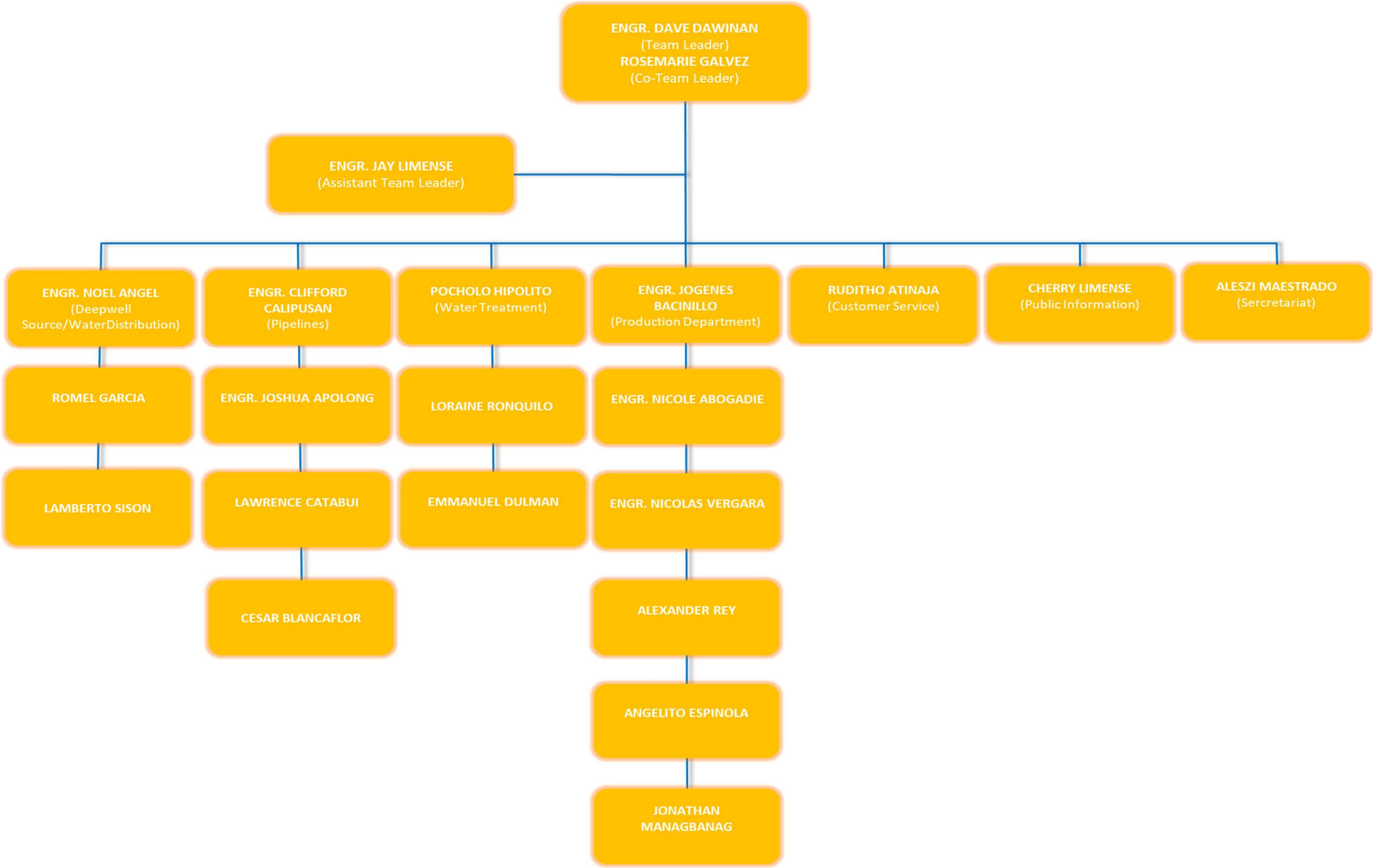
Skills Required to complete the WSP Team		
1	Technical expertise on operation and maintenance of	
	a	Source
	b	Storage
	c	Treatment
	d	Distribution
2	Provide operational support for the WSP in terms of	
	a	Administrative
	b	Financing
	c	Technical
3	Capable of communicating the WSP objectives and outcomes	
	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 programs	
8	With authority	
9	Other team members	
	a	Resource persons
	b	Coordinator
	c	Secretariat
	d	Documentation committee/staff

Table 1.2 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. Dave Dawinan	Team Leader	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
Rosemarie Galvez	Co-Team Leader	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
Engr. Jay Limense	Assistant Team Leader	/	/	/					/		/	/	/	/	/				
Engr. Jogenes Bacinillo	Production Department	/	/	/	/			/	/	/	/	/	/		/				
Engr. Noel Angel	Operation Distribution	/	/	/	/			/	/	/	/	/	/		/				
Engr. Nicole Abogadie	Project Manager	/	/	/	/			/	/		/	/	/		/				
Engr. Nicolas Vergara	NRW Supervisor	/	/		/			/	/				/		/				
Engr. Clifford Calipusan	Engineering Department	/	/	/	/			/	/	/	/	/	/		/				
Engr. Joshua Apolong	Project Manager	/	/	/	/			/	/		/	/	/		/				
Lawrence Catabui	Foreman	/	/	/	/			/	/	/	/	/	/						
Pocholo Hipolito	Treatment/Storage	/	/	/							/	/	/	/					
Loraine Rongquillo	Treatment/Storage	/	/	/							/	/	/						
Emmanuel Dulman	Laboratory Analyst	/	/	/							/	/	/	/					

Ruditho Atinaja	Customer Service	/	/	/	/			/	/	/	/	/	/					
Cherry Limense	Public Information	/	/	/	/			/	/	/	/	/	/					
Aleszi Maestrado	Secretariat												/			/	/	/	/
Alexander Rey	Treatment/Storage	/	/	/	/			/			/		/					
Angelito Espinola	Treatment/Storage	/	/								/							
Jonathan Managbanag	Treatment/Storage	/	/								/							
Lamberto Sison	Pump Operator	/	/								/							
Rommel Garcia	Pump Operator	/	/								/							

Table 1-The San Jose Water/PW-SJDMC Water Safety Plan Team



NAME	DEPARTMENT/ DIVISION	OFFICIAL DESIGNATION	WSPTEAM RESPONSIBILITY	TASK DESCRIPTION IN THE WSP TEAM
Engr. Dave Dawinan	Technical Group	Head	WSP Team Leader	Oversees the following: ➢ Production, quality control/monitoring, storage, and distribution of safe and potable water to consumers ➢ Operation, safeguarding and maintenance of production, treatment, and storage facilities/appurtenances of San Jose Water/Primewater. ➢ Pipeline, implements all corrective and preventive maintenance works: ➢ a). on transmission and distributionmains, line appurtenances and service connection meters ➢ b). on reservoirs and tanks ➢ Implements existing San Jose Water/Primewater policies, Standard Operating Procedures (SOPs), safety practices regarding maintenance works; reviews said policies, SOPs, safety practices and recommends changes as deemed necessary. Coordinates with local government officials and other non-government officials in the implementation of maintenance works to ensure understanding and smooth facilitation of the works required.

Rosemarie G. Galvez	SJDMWD	Assistant General Manager	Co-Team Leader	➢ Overall execution of the WSP, scheduling of meetings, reviewing of WSP manual, submitting reports, and recommending actions including the proposed budget.
Engr.Jay V. Limense	Water Treatment Plant Department	Department Manager – Water Treatment Plant	Assistant Team Leader	➢ Operation, safeguarding and maintenance of Water treatment Plant equipment, structures, and grounds. ➢ Application of chemicals on all stages of the treatment process and assists in the implementation of other water quality management programs. ➢ Initiates the evaluation of existing systems and research on new treatment methods or chemicals and submits recommendation.
Engr.Jogenes Bacinillo	Production Department	Division Manager	Production	Oversees the: ➢ Directs the operation and safeguarding of deepwell sources, lift, booster stations, reservoir stations and other distribution system appurtenances. ➢ Coordinates with the Maintenance and support Services Group regarding the maintenance of equipment, facilities, and appurtenances ➢ Coordinates with Water Quality Management Group regarding the operation of chlorination equipment at deep well

				sources. ➢ Assists in the evaluation of existing systems and submits recommendations. Monitors water supply in the entire service area of San Jose Water/Primewater. ➢ Supervises and monitors corrective and preventive maintenance on all production facilities. ➢ Inspects all production and storage facilities of San Jose Water/Primewater. ➢ Updates maps and database for the improvement of water supply. Ensures the security of San Jose Water/Primewater structures
Alexander Rey	Water Treatment Plant Department	Plant Technician	Water Treatment Plant/ Water Source	➢ Operates and controls all electromechanical equipment and appurtenances of the WTP incoordination with laboratory personnel and adjacent lift/booster stations. ➢ Computes and records production, chemical usage, power usage and other similar data during tour of duty ➢ Assists in the implementation of urgent maintenance activities of the WTP.

Angelito Espinola	Water Treatment Plant Department	Plant Technician	Water Treatment Plant/ Water Source	➢ Operates and controls all electromechanical equipment and appurtenances of the WTP incoordination with laboratory personnel and adjacent lift/booster stations. ➢ Computes and records production, chemical usage, power usage and other similar data during tour of duty ➢ Assists in the implementation of urgent maintenance activities of the WTP.
Jonathan Managbanag	Water Treatment Plant Department	Plant Technician	Water Treatment Plant/ Water Source	➢ Operates and controls all electromechanical equipment and appurtenances of the WTP incoordination with laboratory personnel and adjacent lift/booster stations. ➢ Computes and records production, chemical usage, power usage and other similar data during tour of duty ➢ Assists in the implementationof urgent Maintenance activities of the WTP.

Engr.Clifford Calipusan	Engineering Department	Division Manager - Engineering	Pipelines Maintenance	➢ Plans for, recommends, and implements all corrective and preventive maintenance works on San Jose Water/Primewater transmission and distribution mainlines, appurtenances and service connection meters. ➢ Plans for, recommends, and implements all preventive and corrective maintenance works on San Jose Water/Primewater reservoirs and tanks. ➢ Implements existing San Jose Water/Primewater policies, Standard Operating Procedures (SOPs), safety practices regarding maintenance works; review said policies, SOPs, safety practices and recommends changes as deemed necessary. ➢ Coordinates with local government officials and other non-government officials in the implementation of maintenance works to ensure understanding and smooth facilitation of the works required.

Engr. John Joshua Q. Apolong	Planning and Design Section	Project Engineer	Pipelines	➢ Supervises and assists in the ff activities of the Section: a. Implementation of project, b. Interconnection work, c. Preparation of program works. ➢ Prepares and updates program of works. ➢ Submits reports and communications to superiors regarding the status and accomplishment of the project. ➢ Maintains availability and orderliness of materials. ➢ and equipment for the project
Lawrence C. Catabui	Planning and Design Section	Foreman	Pipelines	➢ Supervises and assists in the ff activities of the Section: a. Implementation of project, b. Interconnection work, c. Preparation of program works. ➢ Prepares and updates program of works. ➢ Submits reports and communications to superiors regarding the status and accomplishment of the project. ➢ Maintains availability and orderliness of materials and equipment for the project.

Venancio Cesar S. Blancaflor	Service Connection and Water Meter Maintenance Division	Sr. Water Maintenance Man A	Pipelines	➢ Supervises, monitors, applicantion for New Connections, Mainline Disconnection and Mainline Reconnection ➢ Prepares and submits all construction and related documentation. ➢ Supervises the restoration of all damaged roads, pavement and other facilities affected by the implementation of all WD utility projects and repairs. ➢ Monitors and submits reports on the status of the ➢ Actual construction of the water supply system of subdivisions turned over to the WD
Pocholo U. Hipolito	Water Treatment Plant Department	Medical Technologist	Water Treatment	➢ Conducts the ff laboratory activities: a. Bacteriological examination of drinking water collected at source and distribution system. b. Preparation of culture media used for bacteriological examination. c. Sterilization of glassware to be used for conducting bacteriological examination. d. Calibration and cleaning of equipment/apparatus used for bacteriological examination. ➢ Collects water samples at source and distribution system for daily water quality monitoring. ➢ Conducts regular inventory of culture media and other materials needed for bacteriological examination. ➢ Prepares monthly report on individual results of bacteriological examination of drinking water. ➢ Maintains cleanliness and orderliness of the

				laboratory
Loraine Ronquilo	Water Treatment Plant Department	Chemist	Water Treatment	➢ Conducts bacteriological and physical/chemical analysis of water samples from all sources and at the distribution system. ➢ Conducts research and testing on new treatment chemicals to keep up with the trend of modern technology. ➢ Determines and recommends proper dosages of coagulants and disinfection chemicals. ➢ Monitors monthly consumption of treatment chemicals and other consumables to always maintain adequate stock. ➢ Prepares and maintains complete records of all laboratory tests and activities. ➢ Cleans, maintains, and calibrates laboratory apparatus and equipment

Emmanuel B. Dulman	Water Treatment Plant Department	Laboratory Analyst	WaterTreatment	➢ Conducts bacteriological and physical/chemical analysis of water samples from all sources and at the distribution system. ➢ Conducts research and testing on new treatment chemicals to keep up with the trend of modern technology. ➢ Determines and recommends proper dosages of coagulants and disinfection chemicals. ➢ Monitors monthly consumption of treatment chemicals and other consumables to always maintain adequate stock. ➢ Prepares and maintains complete records of all laboratory tests and activities. ➢ Cleans, maintains, and calibrates laboratory apparatus and equipment.
Engr. Noel Angel A. Abraham	Bulk Water Supply and Pumping Station Department	Department Manager – Field Operations	Deepwell sources/ Water Distribution	➢ Directs the operation and safeguarding of deepwell sources, lift, booster stations, reservoir stations and other distribution system appurtenances. ➢ Coordinates with the Maintenance and support Services Group regarding the maintenance of equipment, facilities, and appurtenances ➢ Coordinates with Water Quality Management Group regarding the operation of chlorination equipment at deep well sources. ➢ Assists in the evaluation of existing systems and submits recommendations. Monitors water supply in the entire service area of San Jose Water/Primewater. ➢ Supervises and monitors corrective and preventive maintenance on all production facilities.

				➢ Inspects all production and storage facilities of San Jose Water/Primewater. ➢ Updates maps and database for the improvement of water supply. ➢ Ensures the security of San Jose Water/Primewater structures
Engr.Nicolas B. Vergara	Non-Revenue Water Section	Head, NRW Section	Water Distribution	➢ Implements the following activities of the section: a. leak detection, b. day and nighttime flowmeasurement c. smart leak repair technique ➢ Prepares and implements programs in reducing non-revenue water. ➢ Prepares and implements project related in reducing non-revenue water. ➢ Records data gathered on the field and interpreted data for further actions. ➢ Submits reports and communications regarding the activities and accomplishments of the group.

Engr.Nicole Jan A. Abogadie	Bulk Water Supply and Pumping Station Department	Engineer	Deepwell sources/ Water Distribution	➢ Directs the operation and safeguarding of deepwell sources, lift, booster stations, reservoir stations and other distribution system appurtenances. ➢ Coordinates with the Maintenance and support Services Group regarding the maintenance of equipment, facilities, and appurtenances. ➢ Coordinates with Water Quality Management Group regarding the operation of chlorination equipment at deep well sources. ➢ Assists in the evaluation of existing systems and submits recommendations. Monitors water supply in the entire service area of San Jose Water. ➢ Supervises and monitors corrective and preventive maintenance on all production facilities. ➢ Inspects all production and storage facilities of San Jose Water/Primewater. ➢ Updates maps and database for the improvement of water supply. ➢ Ensures the security of San Jose Water/Primewater structures.
Lamberto A. Sison	Bulk Water Supply and Pumping Station Division	Sr. Water Resources Facilities Operator A	Water Distribution	➢ Operates pumping units and water treatment equipments within jurisdiction to maintain adequacy and safety of water supply. ➢ Monitors, checks, and records all meter readings and other related data and accomplishes daily operation records. ➢ Manipulates distribution valves to meet water supply schedule and to facilitate mainline leak repair. ➢ Conducts routine chlorine residual monitoring and

				checks water supply schedule on selected points of the distribution system. ➢ Logs important events/abnormalities during tour of duty and informs superiors if necessary. ➢ Attends to customer complaints/requests.
Rommel P. Garcia	Bulk Water Supply and Pumping Station Division	Sr. Water Resources Facilities Operator A	Wate Distribution	➢ Operates pumping units and water treatment equipments within jurisdiction to maintain adequacy and safety of water supply. ➢ Monitors, checks, and records all meter readings and other related data and accomplishes daily operation records. ➢ Manipulates distribution valves to meet water supply schedule and to facilitate mainline leak repair. ➢ Conducts routine chlorine residual monitoring and checks water supply schedule on selected points of the distribution system. ➢ Logs important events/abnormalities during tour of duty and informs superiors ifnecessary. ➢ Attends to customer complaints/requests.

Ruditho B. Atinaja	Customer Service	Section Head – Customer Service	Customer Service	➢ Assists in supervising and monitoring service application aspects of the Marketing and Service Application Section. ➢ Approves processed New Connection (NC) applications, Maintenance Orders (MO) for Inspection and Estimate, ReconnectionDisconnection, Mainline Disconnection and Service Requests. ➢ Disseminates Water District/Primewater programs and policies. ➢ Entertains complaints/reports from WD/PW concessionaires and concerned citizens. ➢ Verifies adjustment to receivables and prepares notice to concessionaires. ➢ Prepares adjustment memo based on complaints
Cherry E. Limense	Human Resources	Human Resources Assistant	Public Information	➢ Compiles and writes press releases, news items, captions, and feature articles of the San Jose Water/Primewaterfor publication at local and national newspaper and for broadcast at the radio and television. ➢ Establishes and maintains cordial relations with the media and other civic oriented groups. ➢ In charge of the newsletter, brochures, information aides and the annual report of the waterdistrict ➢ File clippings and articles regarding San Jose Water/Primewater and its activities ➢ Recommends to management solutions to public relation problems.

				➢ Monitor all systems operations of the San Jose Water/Primewater to be aware on pertinent facts and data whenever queries are raised by media group, etc. ➢ Promotes and designs programs that shall establish the role of the San Jose Water/Primewater in thecommunity in which it is dedicated to the advancement of the public interest/to gain the confidence of the public in the San Jose Water/Primewater's capacity to render good if not excellent service and to provide safe and potable water. ➢ Performs any public relations related works as been tasked by the BranchManager. ➢ Performs other related duties that maybe assigned from time to time by the Branch Manager.
Aleszi Maestrado	Office of the Branch Manager	Clark Processor	Secretariat	➢ Performs clerical job. ➢ Type letters, reports memorandums and other needed documents. ➢ Files and maintains records of all correspondence and reports. ➢ Prepares and dispatches request of the team needed for the operation. ➢ Performs other function that maybe assigned from time to time.

Duties and Responsibilities

TEAM LEADER

Responsible for the overall execution of the WSP, scheduling of meetings, reviewing of WSP manual, submitting reports, and recommending actions including the proposed budget.

ASSISTANT TEAM LEADER

Assists the team leader and prepares budget proposal, checks, and reviews report to be submitted.

SECRETARIAT/ RECORD KEEPING GROUP

Record minutes of meetings, documentation of all WSP activities and coordination with other agencies, including the keeping of all SOP manuals.

TECHNICAL GROUP

Monitor and consolidate reports of the technical team, such as water source, transmission, distribution, and maintenance. In-charge of the Technical Coordination Meeting.

WATER SOURCE

Submit reports, inspect all sources for possible contamination, record and update hazardous events not included in the WSP manual.

TREATMENT/STORAGE GROUP

Submit reports, inspect treatment area for possible contamination, record and update hazardous events not included in the WSP manual, verify the quality of the water, and submit report of analysis.

Submit reports, inspect all storage tanks for possible contamination, record and update hazardous events not included in the WSP manual.

TRANSMISSION/ DISTRIBUTION GROUP

Submit reports, inspect all pipelines for possible contamination, record and update hazardous events not included in the WSP manual.

CUSTOMER SATISFACTION GROUP

Submit consumer's water quality complaints.

FINANCE AND ADMINISTRATIVE GROUP

Submit reports and provide operational support related to financing and other administrative concerns.

SEPTAGE MANAGEMENT GROUP

Conduct scheduled siphoning and inspection of septic tank system and submit reports for possible contamination, record and update hazardous event not included on WSP manual.

INTERNAL AUDIT

Receive reports and check if the activities identified in the WSP are being carried out in practice and records are being kept.

STAKEHOLDERS

Attend and monitor WSP activities and coordinate with their respective agency or organization regarding the WSP of San Jose Del Monte City PrimeWater and help the of San Jose Del Monte City Water District in preventing the contamination of the water being distributed to consumers.

Schedule of Regular Team Meetings

Regular meetings of the WSP Team will be held quarterly on the 1st week of January, April, July, and October. Emergency meetings may be held whenever necessary (especially after the occurrence of a major incident).

Table 4-SanJoseWater/PW-SJDMC Stakeholders

3				Interaction Mechanism	Record of Interaction
Name	Relationship to Drinking Water Supply Issues	Point of Contact with WSP Team	Issues with Drinking Water Supply		
Local Water Utilities Administration	Regulatory	Submission of WQ Report	WaterQuality	Reporting	Monthly Report
Metropolitan Water Works Sewerage System	Bulk Water Supplier	MOA Signing/MeterRdg.	Allocation and Water Rates	Meetings	Minutes of Meetings, MOA and SOA
Department of Environment and Natural Resources	Environment Protection Authority	Regulatory Monitoring	Effluent Quality	Reporting	Reports
City Health Office	Regulatory	Regulatory Monitoring	Water Quality	Reporting	Reports
City Engineer's Office	Local Regulatory	Project/Leakrepair coordination	Water Quality	Meetings/Communication	Minutes of Meetings
Department of Public Works and Highways	Local Regulatory	Project/Leakrepair coordination	Water Quality	Meetings/Communication	Minutes of Meetings

Meralco	Supplier (Energy)	Power interruption coordination	WaterQuality/ IntermittentSupply	Reporting	Reports
AMGAT	Bulk WaterSupplier	MOA Signing/MeterRdg.	Water Qualityand Rates	Joint MeterReading	SOA
LCWDC	Bulk Water Supplier	MOA Signing/Meterreading	Water Quality and Rates	Joint Meter Reading	SOA
Homeowners Association	Community partner	Turn-over and coordination meeting	Water Quality and Rates	Meetings/Communication	Minutes of Meetings
Brgy. Officials	Community partner	Coordination meeting	Water Quality and Rates	Meetings/Communication	Minutes of Meetings
Suppliers	Industry partner	Procurement/Delivery	Supply quality and quantity	Purchase requisitions, Purchase orders	Delivery receipts
Household near Pump Stations	Community partner	Coordination meeting	Supply quality and quantity	Reporting	Reports
PNP	Police authority	Safety of Facility	Water Quality	Reporting	Reports

II. THE WATER SUPPLY SYSTEM

San Jose Water/PW-SJDMC gets its source from surface water and groundwater. It has a total length of pipelines laid of 666,597.35 linear meters, traversing the slopes of the city. San Jose Water/PW-SJDMC divided its service area into two parts– “Area”, which is within Sapang Palay Resettlement Project (SPRP) and “Non-Area” which is outside SPRP. Non-Area is composed of barangays outside SPRP and numerous private subdivisions - some of which had their water systems turned over to San Jose Water/PW-SJDMC.

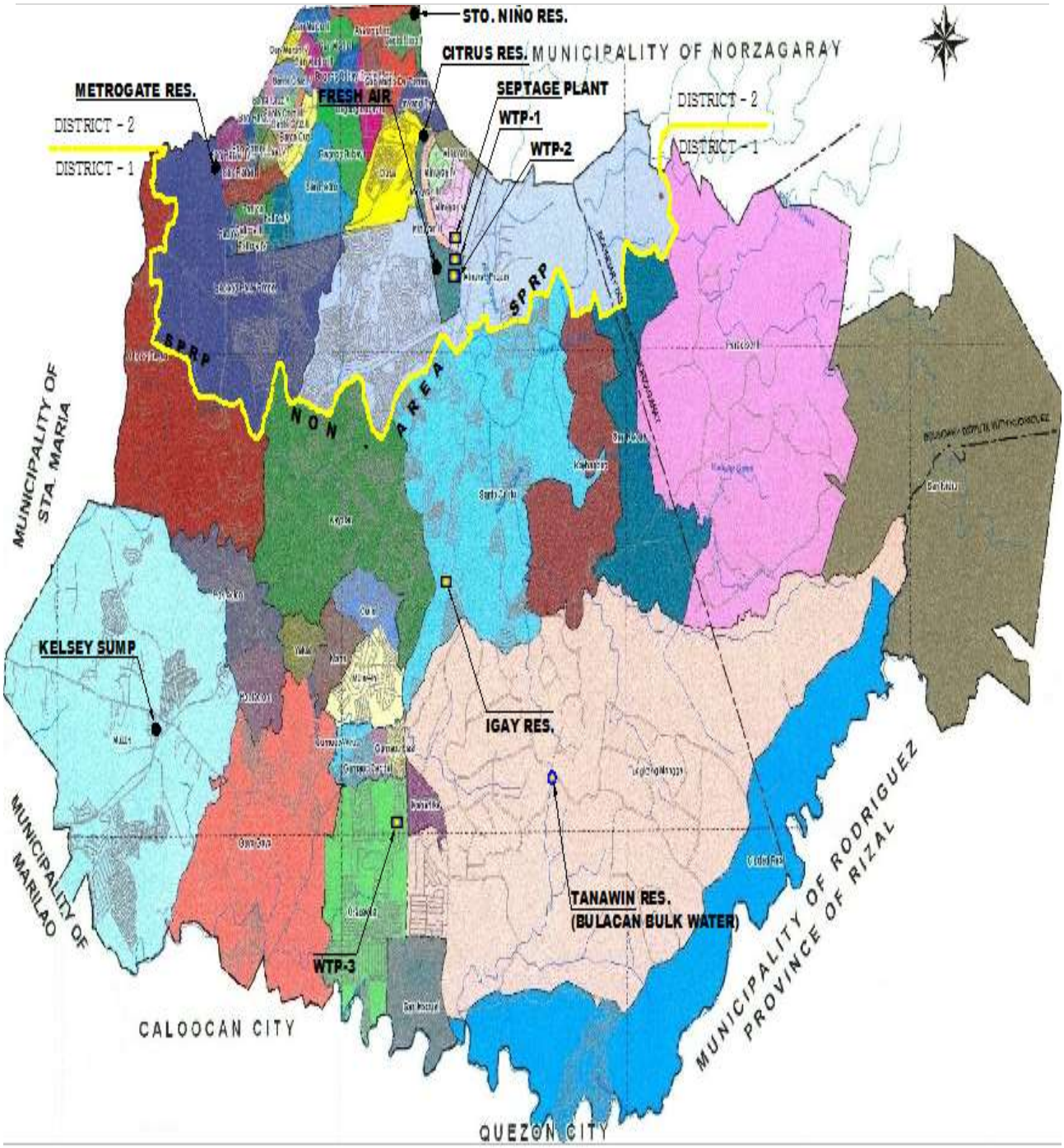
The City of San Jose Del Monte is largely a resettlement area of the government. Month by month, families from nearby Metro Manila’s depressed areas come in droves to settle in government low-cost housing units. These relocated families comprise 43% of San Jose Water/PW-SJDMC service area, while the remaining 57% of the served population is from private subdivisions which water systems have been turned over to San Jose Water/PW-SJDMC, two bulk water supply concessionaires and erst while residents of the city.

San Jose Water/PW-SJDMC serves more than 119,000 residences and establishments within the city twenty-four hours a day, seven days a week. Service connections are classified as 96.30% residential which comprises the majority of the served population, 3.49% commercial, and 0.27% government institutions.

Residential class is intended for domestic cconsumption. Commercial class is intended for business purposes. Because of the city's rapid growth in population, San Jose Water/PW-SJDMC must cope with the city's increasing demand for fresh and potable water.

San Jose Water's water quality conforms to standards set by the Philippine National Standards for Drinking Water to guarantee that the water supplied to consumers is of the highest quality, potable and safe for general domestic use and consumption.

The water supplied to concessionaires averages 0.5 mg/L chlorine residual with no objectionable color, odor, and taste. It has chemical constituents that are within the limits and free from indicator organisms (Coliform, E. Coli).



LOCATION MAP OF SJDMCWD MAJOR FACILITIES

WATER SOURCES

Surface Water

MWSS Raw Water Allocation

San Jose Water/PW-SJDMC has a total raw water allocation of 80,000 cmd from Metropolitan Water works and Sewerage System (MWSS). The allocated raw water supply comes from the Umiray- Angat-Ipo system in Norzagaray, Bulacan.The heart of the system is the Angat Dam, which is a multi-purpose dam and is intended for power, irrigation, and water supply. To date, San Jose Water/ PW-SJDMC gets close to 71,600 cum of raw water per day through MWSS' Aqueduct No. 6 which passes adjacent to the Water Treatment Plant Compound of San Jose Water.

Bulk Water

The Angat Bulk Water Supply Project (ABWSP)

The Angat Bulk Water Supply Project (ABWSP) produces 15,000 cmd treated water that augments the water requirement for Brgy. Muzon and some portions of Sapang Palay Resettlement Area. Brgy. Muzon is the city's biggest and most populous barangay and also the farthest from San Jose Water's Water Treatment Plants. Water from ABWSP undergoes regular chemical, bacteriological, and physical analysis.

Bulacan Bulk Water Supply

The Bulacan Bulk Water Supply Project (BBWSP) (under the Luzon Clean Water Development Corporation) water treatment plant is located at Pleasant Hills Subdivision, Bgy. San Manuel. It supplied treated water that augments the water requirement for Brgys. Tungkong Mangga, San Manuel, Maharlika, GumaoK East, Gumaok West, Gumaok Central, Graceville and Gaya – Gaya.

Groundwater

Most of San Jose Water/PW-SJDMC ground water stations are located within the residential area of the city. The management have to purchase the lot where the ground water will be extracted, some were preexisting and were donated by private subdivisions which water systems were turned over to San Jose Water.

At present, San Jose Water/PW-SJDMC makes use of 10 deep well stations located in Non-Area. These deep wells have rated capacity of 25 to 190 gpm. The treatment for groundwater involves the use of Liquid Chlorine Dioxide and Liquid Calcium Hypochlorite.

A. WaterTreatment

Water Treatment Plant No.1

San Jose Water/PW-SJDMC uses the standard coagulation-flocculation-clarification-, rapid gravity media filtration and chlorine gas disinfection. WTP1 uses the coagulation-flocculation process but employs the pulsator clarifier for turbidity reduction. It undergoes single media filtration and final disinfection through chlorination. The system has the capability for preliminary, intermediate, and post- chlorination. The system also employs back-up use of liquid calcium hypochlorite if chlorine gas is not available. The water treatment plant uses Poly Aluminum Chloride for the coagulation, as well as provision for use of additives such as Polymer.

The first step of the process involves proper mixing of raw water with PAC (Poly Aluminum Chloride) with10% minimum alumina content as coagulant with contact time of less than 1 min. Chlorine is also added for preliminary disinfection to eliminate the existing micro-organism (algae, bacteria) that is likely to grow in the structures and sludge blanket.

Water contains colloidal suspended solid which must be gathered into heavy floc to allow settling which takes place into two steps: coagulation that involves destabilizing the colloid to precipitate and flocculation process that intends to increase the cohesion of the floc formed by coagulation.

Following this process is settling, that is allowing the particles in suspension in the

water to settle by gravity to improve water quality. Each Pulsator clarifier is designed to treat half of the entire flow. Clarified water is evenly collected over the whole surface by perforated troughs and flows into a canal feeding four filters. Sludge formed from the clarifier flows by gravity in the WTP 2 sludge lagoon for disposal.

Filtration is designed to remove particles suspended in water. The filters provide a 1.2m water depth above the filter media. The sand layer allows intensive washing with air and water without any grain size degrading or mud ball formation. Filter back washing is carried out by air and water together with surface sweeping using clarified water. The wash water from the filter backwashing goes into the wash water recycling tank and let to stand for 1 hour before recovery and pumped into the flash mixer. The filtered water flows by gravity from the filtered water channel outlet into a covered storage tank.

The final process involves injecting chlorinated water into the filtered water tank to disinfect any remaining contaminant in the water that may be dangerous to the health, as well as to meet the standard set in residual chlorine by the PNSDW (0.3 ppm to 1.5 ppm limit for sodium and calcium hypochlorite while 0.2 ppm to 0.4 ppm limit for chlorine dioxide) to assure safe drinking water. Chlorinated water then flows into the Treated Water tank with capacity of 1,100m³, which goes to the distribution system.


SAN JOSE DEL MONTE CITY WATER DISTRICT
WATER TREATMENT PLANT NO. 1
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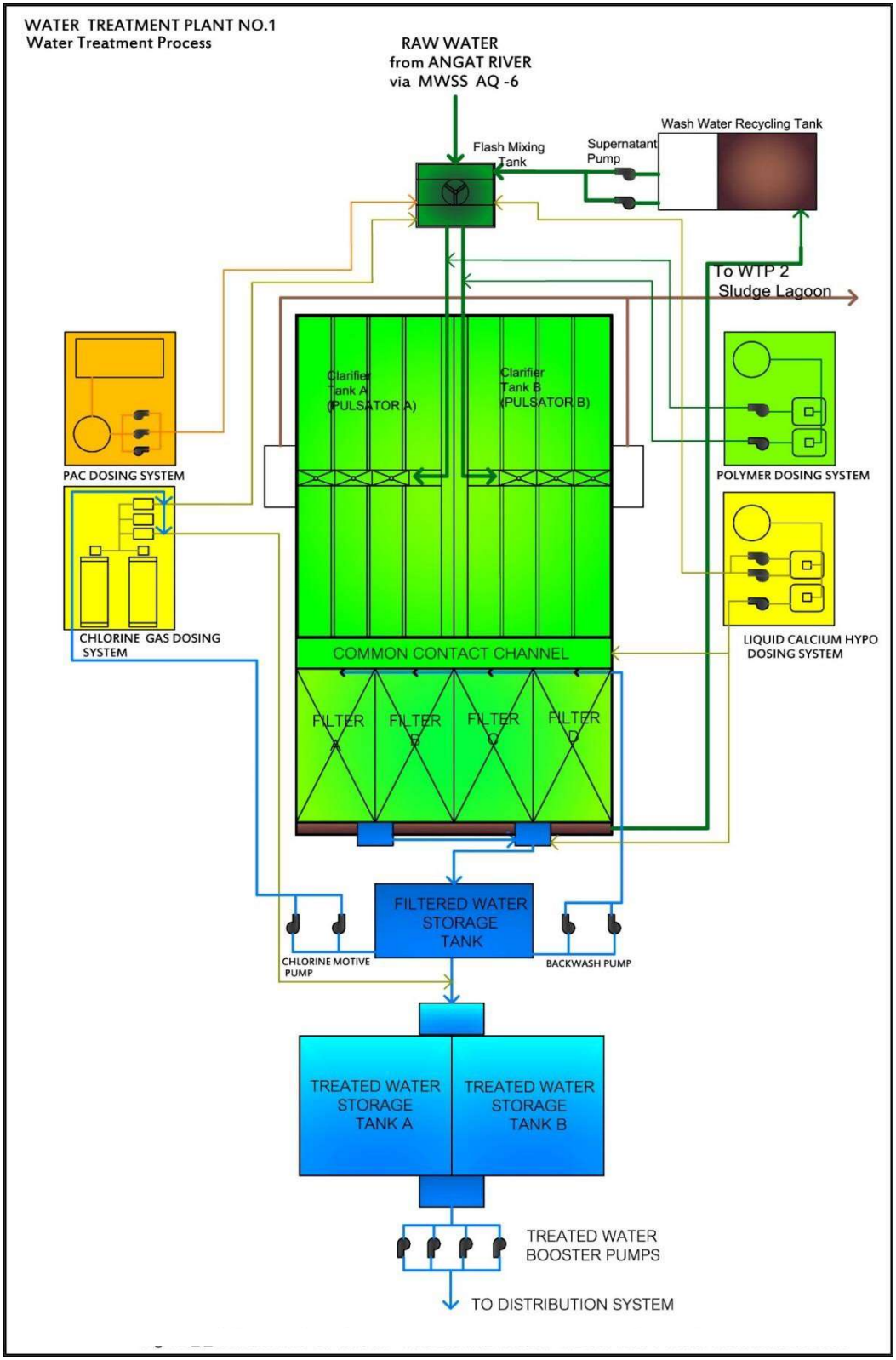
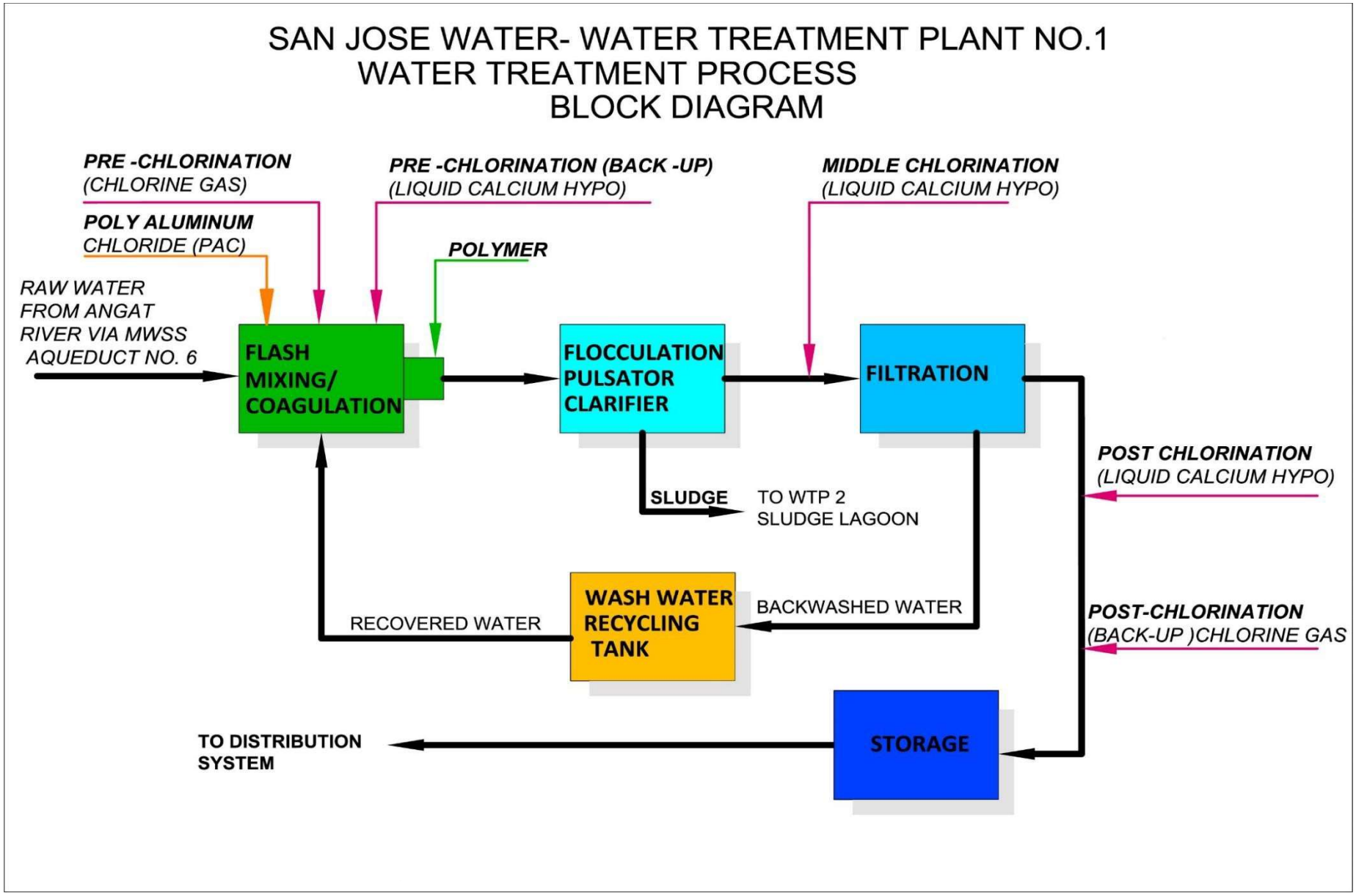


Figure2-Schematic Diagram of WTP No.1 Water Treatment Process


SAN JOSE WATER- WATER TREATMENT PLANT NO.1
WATER TREATMENT PROCESS
BLOCK DIAGRAM
PRE -CHLORINATION
(CHLORINE GAS)
PRE -CHLORINATION (BACK -UP)
(LIQUID CALCIUM HYPO)
MIDDLE CHLORINATION
(LIQUID CALCIUM HYPO)
POLY ALUMINUM
CHLORIDE (PAC)
POLYMER
RAW WATER
FROM ANGAT
RIVER VIA MWSS
AQUEDUCT NO. 6
FLASH
MIXING/
COAGULATION
FLOCCULATION
PULSATOR
CLARIFIER
FILTRATION
POST CHLORINATION
(LIQUID CALCIUM HYPO)
SLUDGE
TO WTP 2
SLUDGE LAGOON
WASH WATER
RECYCLING
TANK
BACKWASHED WATER
RECOVERED WATER
POST-CHLORINATION
(BACK-UP)CHLORINE GAS
STORAGE
TO DISTRIBUTION
SYSTEM

Water Treatment Plant No.2

Raw water flows to WTP2 under pressure from aqueduct via a 600mm diameter pipework. This raw water is then pre-treated in the form of screening and grit removal before flowing into the raw water tank to assist in equalizing any peaks of high turbidity and some minor setting. The 30 mld flow then proceeds to the succeeding treatment process within WTP 2.

PAC together with Chlorine Gas is added and mixed uniformly with raw water by two installed paddle mixers. The system has back-up use of liquid calcium hypochlorite for chlorination like the WTP 1 and provision for polymer addition. Right after is the first stage of Pre-Treatment which is screening. Two screens will prevent large solids from further entering the WTP process. The automatic screen cleaning mechanisms and screening conveyor are activated by the measurement of differential levels across the screen or after a preset time. The screenings collected are discharged into a discharge chute and then to a screening bin located at ground level adjacent to the raw water inlet structure.

A grit separation system is utilized after the screens to remove sand and grit particles form the raw water supply. In the aerated grit chamber, grit is removed by causing the raw water to flow in a spiral pattern. Air is introduced to the grit chamber via blowers and air diffusers along one side causing a perpendicular spiral velocity pattern to flow through the tank.

In the grit removal system, baffled walls are installed to facilitate coagulation and are facilitated by flocculation process which is slow mixing of coagulated raw water that allows particles to gather to form larger, heavier particles called "floc" which will be settled in the raw water tank. In the raw water tank, the training walls facilitate long detention time to allow proper settling time for the heavier flocs to form as sludge at the bottom of the tank. A small inlet pipe inside the raw water tank supplies the Amiad Microfiber Filter with flow of 2,500m¬³ each.

Water then flows into the two flocculation tanks and flows again by gravity into the common inlet channel. From the inlet channel the water flow is divided into six (6) filter units for filtration of water. Dirty wash water from the filter units gravitates to one of two Sludge Separation Tanks. The sludge from the SST gravitates in the sludge lagoon and supernatant is pumped back to the inlet chamber of WTP 2.

The filtered water from the filter units and Amiad microfiber filter enters the Contact Channel where it is dosed with chlorine prior to entering the Clear water Tanks. The chlorinated clear water is then pumped into the Distribution system.

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WATER TREATMENT PLANT No.2

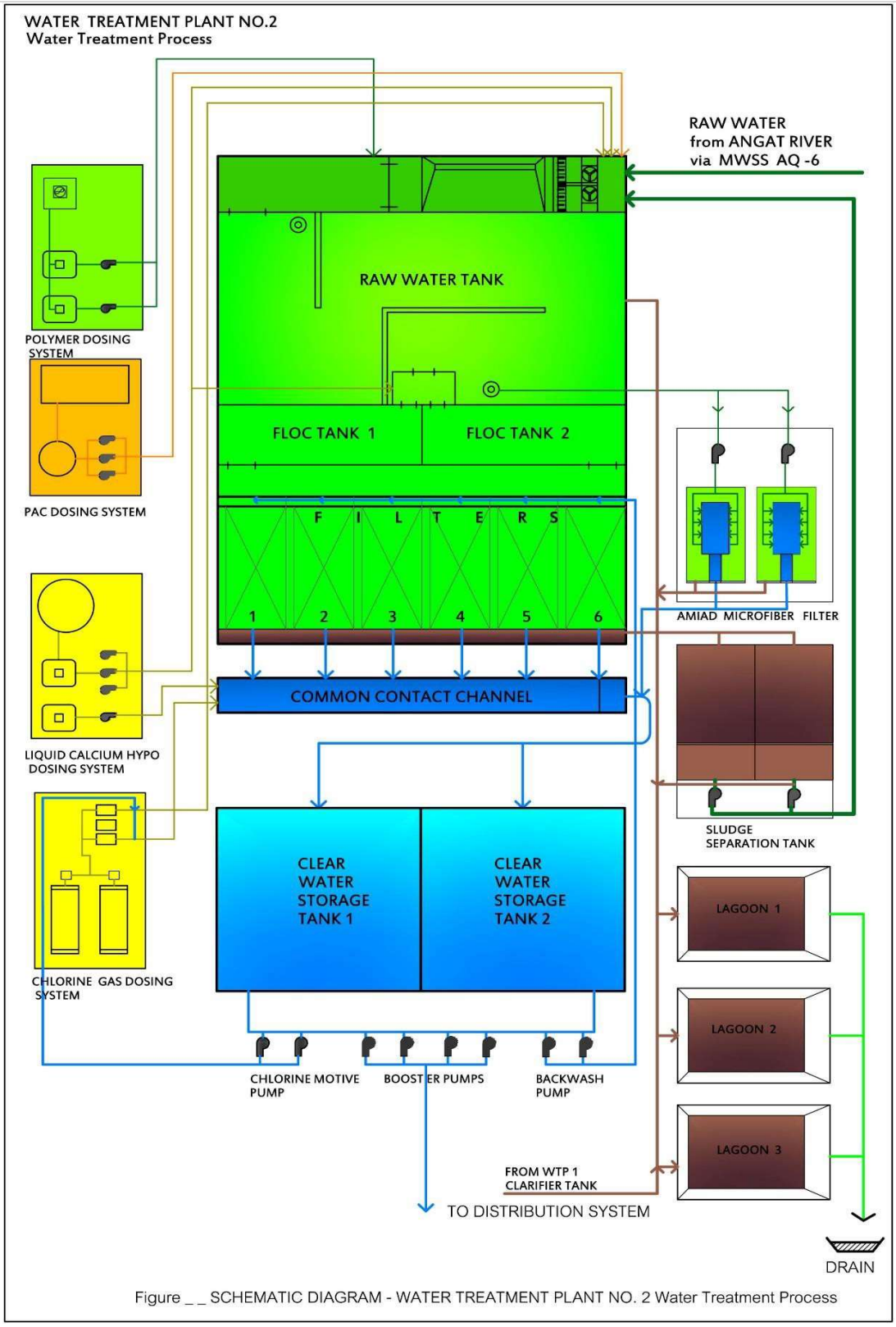


Figure _ _ SCHEMATIC DIAGRAM - WATER TREATMENT PLANT NO. 2 Water Treatment Process

Figure 4- Schematic Diagram of WTP No.2 Water Treatment Process

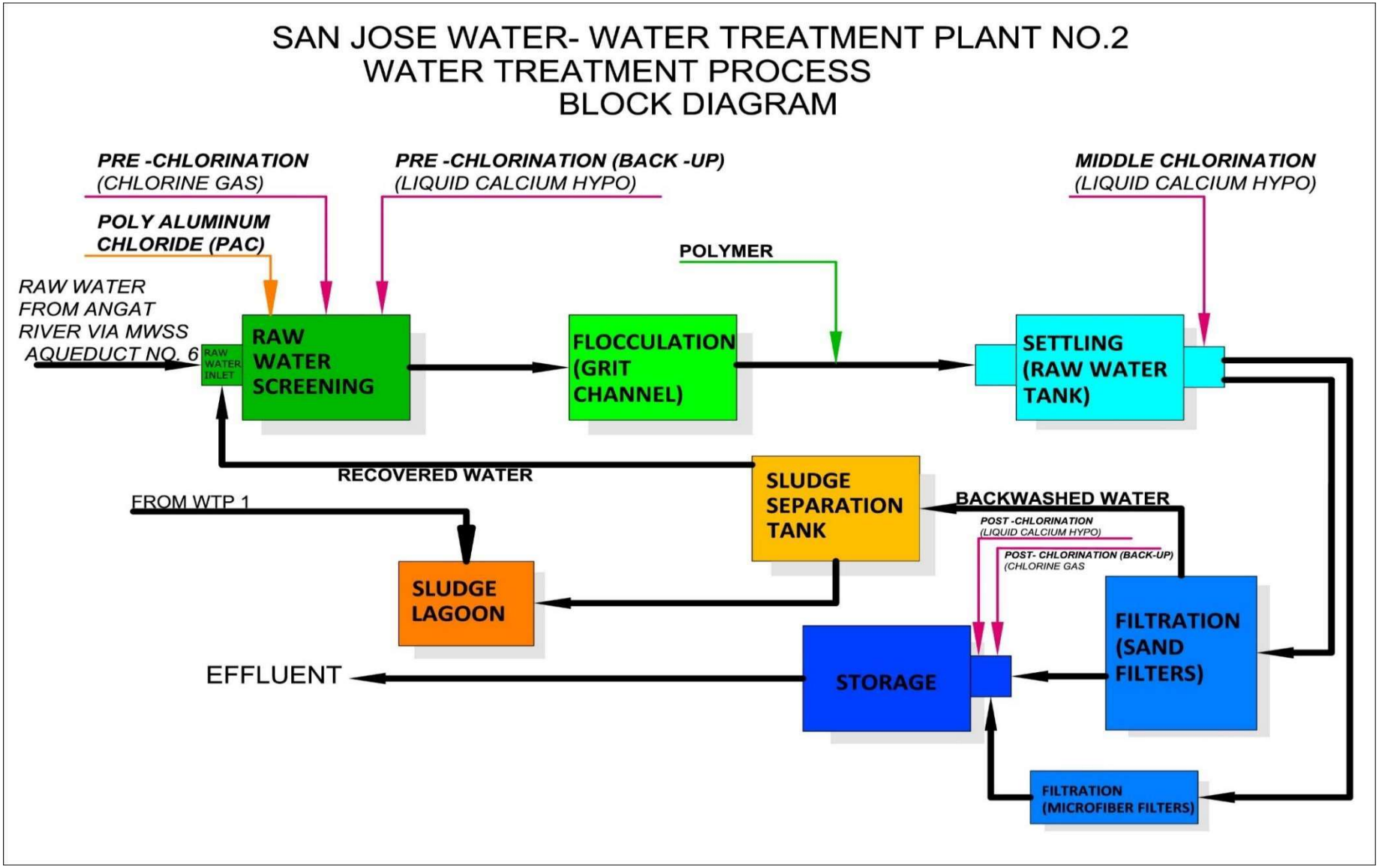


Figure5 -Block Diagram of WTP No.2 Water Treatment Process

Water Treatment Plant No.3

Raw water flows to WTP3 from aqueduct via a 600mm diameter pipework through a cistern since the pressure is not adequate to reach WTP3 facility. This raw water from the cistern is then conveyed through booster pumps. The 10 mld flow then proceeds to the WTP3 for the succeeding treatment process.

WTP3 uses the lamella clarifier for coagulation-flocculation process and pressure filters for turbidity removal. PAC together with liquid calcium hypochlorite is added and mixed uniformly with raw water after entering the clarifier.

In the grit removal system, baffled walls are installed to facilitate coagulation and are facilitated by flocculation process which is slow mixing of coagulated raw water that allows particles to gather to form larger, heavier particles called "floc". The flocculated raw water is then transferred to lamella settling tank. A **lamella clarifier** or **inclined plate settler** (**IPS**) is a type of settler designed to remove Particulates from liquids. Solid particles begin to settle on the plates and begin to accumulate in collection hoppers at the bottom of the clarifier unit. The sludge is drawn off at the bottom of the hoppers and the clarified liquid exits the unit at the top over a weir.

Water then flows into the clarified water tank. From the clarified water tank outlet pipe, water is pumped by filtration pumps into ten (10) pressure filter units for filtration of water. Dirty wash water from the filter units is flushed in the sludge lagoon and supernatant is pumped back to the inlet chamber of WTP2. The filtered water is then stored in clear water tanks then injected into the

distribution system via booster pumps.

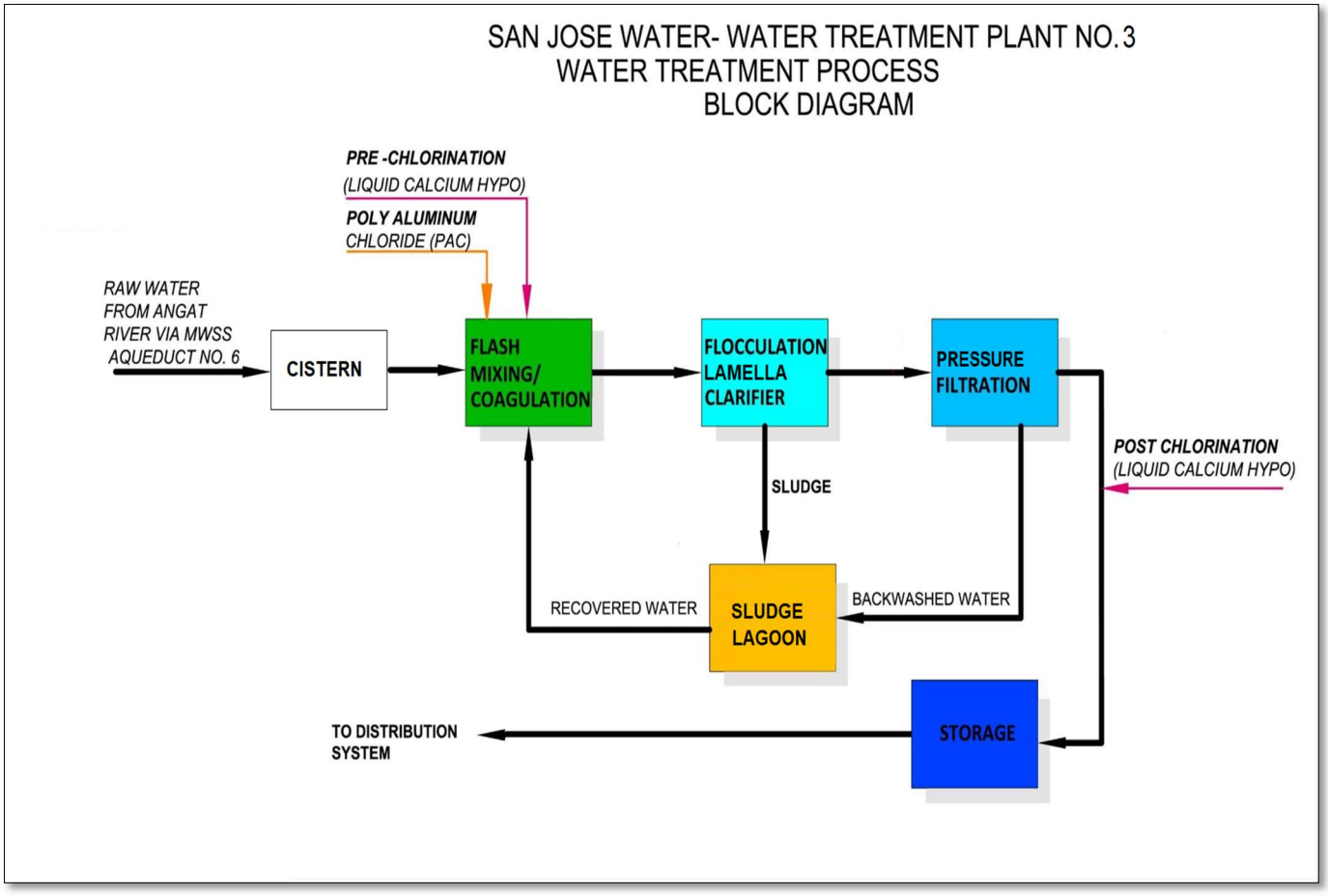


Figure 6-Schematic Diagram of WTPNo.3 Water Treatment Process

Groundwater

San Jose Water/PW-SJDMC existing deep well facilities in Non-Area include 10 deep well stations, network of pipelines, elevated water tanks and reservoirs. These deep wells have a rated capacity of 136 to 1,036 cmd. The treatment for ground water involves the use of Liquid Chlorine Dioxide and Liquid Calcium Hypochlorite.

The deep well facilities augment water pressure in the high portions and far end of the pipelines of the service areas.

The water quality of the groundwater is compatible with the PNSDW and thus, do not require any treatment except for preventive disinfection using Liquid Calcium Hypochlorite.The water sample taken from the distribute online 100 meters away from the well source should have a minimum 0.30-ppm of residual chlorine. Based on the result of field monitoring, the dosing of chlorine at pumping stations will be adjusted accordingly.

Deepwell stations operated by San Jose Water/PW-SJDMC as of May 2023 including their addresses, operating schedules, and capacities.

Table 1 - Active Deep Well Stations

Source No.	Pumping StationNo.	Location	Operating Schedule	Capacity m^3/day
1	13	Blk 7 Lot 19 Phase 2A Ciudad Real Subd., CSJDM, Bulacan	12 hrs.a day	136
2	20	Morning Glory Subd.Brgy. DulongBayan CSJDM, Bulacan	24 hrs.a day	709
3	24	Melody Plains Subd. Brgy Muzon, CSJDM, Bulacan	24 hrs.a day	660
4	26	Phase E2, Francisco Homes Subd., CSJDM, Bulacan	24 hrs.a day	600
5	27	Phase I, Pabahay 2000, CSJDM, Bulacan	24 hrs.a day	1,036
6	28	Block 5 Sarmiento Homes Subd., CSJDM, Bulacan	8 hrs. a day	975
7	29	Blk 8, Phase 2A, Ciudad Real Subd.CSJDM, Bulacan	24 hrs.a day	247
8	53	Verde Heights / Scottsdale Subd. CSJDM, Bulacan	8am–1pm	818
9	54	Blk 13, Francisco Homes 2 Subd. CSJDM, Bulacan	24 hrs.a day	545
10	C2B	Carissa 2B, Brgy Kaypian CSJDM, Bulacan	12 hrs.a day	134

Table 2 – San Jose Water/PW-SJDMC Transmission and Distribution Line

Diameter	MaterialsType	Length(m)
1000 mmØ	EL-CTECSteelPipe	2,388.00
600 mmØ	CL-CTECSteelPipe	4,075.24
400 mmØ	HDPE Pipe	25,500.29
400 mmØ	CL-CTECSteelPipe	11,597.58
300 mmØ	CL-CTEC/PVC/SteelPipes	4,448.23
250 mmØ	CL-CTEC/PVC/SteelPipes	10,571.02
200 mmØ	PVC/HDPE/ACP	32,500.38
150 mmØ	PVC/CL-CTEC/ CIP/ GIPipes	125,642.04
100 mmØ	PVC/HDPE/ACP/ CIP/BIP/GIPipes	143,092.27
75 mmØ	PVC/HDPEPipes	113,370.84
63 mmØ	HDPEPipes	5,672.41
62 mmØ	HDPEPipes	250.0
50 mmØ	PVC/GIP/HDPEPipes	182,470.45
38 mmØ	PVCPipes	3,003.6
32 mmØ	HDPEPipes	1,500.0
25 mmØ	HDPEPipes	515.0
TOTAL		**666,597.35 lm**

TRANSMISSIONLINE = 216,722.77

DISTRIBUTIONLINE = 449,874.58

TOTAL LENGTH OF PIPELINES AS OF APRIL 2023 = **666,597.35 L.M.**

Table 3 – Storage

Item No.	Res. No.	Location	Description	Volume Capacity (m^3)	Service Area	Year Constructed/ Turned over
1	4	Sapang Palay National High School, Brgy. Fatima 5, Area E, Sapang Palay, CSJDM, Bulacan	Elevated Steel Reservoir	227	Brgys. Fatima, Proper and Dulong Bayan	1974
2	5	Phase 2, Brgy. San Rafael 4, Sapang Palay, CSJDM, Bulacan	Elevated Steel Reservoir	227	Brgy. San Rafael	1975
3	7	Zone 1, Hulo Poblacion, City of San Jose del Monte, Bulacan	Elevated Reinforced Concrete Reservoir	380	Brgy. Poblacion	1970
4	8	Block 9 Phase G Francisco Homes Subdivision, CSJDM, Bulacan	Elevated Steel Reservoir	227	Francisco Homes I Subdivision	1983
5	9	Phase K Francisco Homes Subdivision, City of San Jose del Monte, Bulacan	Elevated Steel Reservoir	227	Francisco Homes I Subdivision	1983
6	11	Phase D Francisco Homes, City of San Jose del Monte, Bulacan	Elevated Steel Reservoir	227	Francisco Homes I Subdivision	1990
7	15	Block 8 Nayong Lourdes I Subdivision, City of San Jose del Monte, Bulacan	Elevated Steel Reservoir	76	Nayon Lourdes I Subdivision, Brgy. Maharlika	1981
8	18	Saudi Arabia St., Harmony Hills 1 Sundivision, CSJDM, Bulacan	Elevated Steel Reservoir	284	Harmony Hills I Subdivision, Brgy. Muzon	1997
9	19	Block 54 Harmony Hills I Subdivision, City of San Jose del Monte, Bulacan	Elevated Steel Reservoir	284	Harmony Hills I Subdivision, Brgy. Muzon	1997

10	21	Block 16 Phase I Francisco Homes Subdivision, City of San Jose del Monte, Bulacan	Elevated Steel Reservoir	95	Francisco Homes I Subdivision	1983
11	22	Block 10 Evergreen Heights, City of San Jose del Monte, Bulacan	Elevated Steel Reservoir	120	Evergreen Heights Subdivision	TO 1995
12	23	Block 46 Melody Plains Subdivision, City of San Jose del Monte, Bulacan	Elevated Reinforced Concrete Reservoir	681	Melody Plains Subdivision, Brgy. Muzon	TO 1997
13	24	Block 106 Melody Plains Subdivision, City of San Jose del Monte, Bulacan	Elevated Reinforced Concrete Reservoir	454	Melody Plains Subdivision, Brgy. Muzon	TO 1997
14	25	Phase II Bahay Bayanihan Pabahay 2000, City of San Jose del Monte, Bulacan	Elevated Reinforced Concrete Reservoir	454	Pabahay 2000, Brgy. Muzon	TO 1997
15	28	Block 5 Sarmiento Homes, City of San Jose del Monte, Bulacan	Elevated Steel Reservoir	227	Sarmiento Homes Subdivision, Brgy. Muzon	TO 1998
16	34	Block 17 Lot 33 Phase V, Pleasant Hills Subdivision, CSJDM, Bulacan	Elevated Steel Reservoir	189	Pleasant Hill Subdivision, Brgy. San Manuel	TO 2001
17	35	Block 1 Lot 21, 22 Phase VI, Pleasant Hills Subdivision, CSJDM, Bulacan	Elevated Steel Reservoir	227	Pleasant Hill Subdivision, Brgy. San Manuel	TO 2001
18	38	Block 6 Central Gumaok, City of San Jose del Monte, Bulacan	Elevated Steel Reservoir	150	Brgy. Gumaok	1996
19	41	Block 3 Lot 8 Diamond Crest Village, Brgy. San Manuel, CSJDM, Bulacan	Elevated Steel Reservoir	189	Diamond Crest Village, Brgy. San Manuel	TO 2003
20	42	Block 13 Phase I Dela Costa Homes III, CSJDM, Bulacan	Elevated Steel Reservoir	189	Dela Costa Homes III Subdivision, Brgy. Tungkong Mangga	TO 2003

21	43	Block 9 Phase II Dela Costa III	Elevated Steel Reservoir	189	Dela Costa Homes III Subdivision, Brgy. Tungkong Mangga	TO 2003
22	44	Block 27 Phase IV Dela Costa III	Elevated Steel Reservoir	150	Dela Costa Homes III Subdivision, Brgy. Tungkong Mangga	TO 2003
23	45	Igay Reservoir	Ground Reinforced Concrete Reservoir	1400	Whole NonArea Subsysterm	2004
24	47	Citta Roma Subdivision, Brgy. Gaya-gaya, CSJDM, Bulacan	Elevated Steel Reservoir	150	Citta Roma Subdivision, Brgy. Gayagaya	TO 2005
25	48	Villa San Jose Subdivision	Elevated Steel Reservoir	114	Villa San Jose Subdivision, Brgy. Gayagaya	TO 2005
26	49	Block 4 L 2 Verde Heights Subdivision, Brgy. Gayagaya, CSJDM, Bulacan	Elevated Steel Reservoir	50	Verde Heights Subdivision	TO 2006
27	50	Block 14 Verde Heights Subdivision	Elevated Steel Reservoir	227	Verde Heights Subdivision	TO 2006
28	51	Block 60 Dela Costa Homes IV Subdivision	Elevated Steel Reservoir	160	Dela Costa Homes IV Subdivision	TO 2006
29	52	Block 63 Dela Costa Homes IV Subdivision	Elevated Steel Reservoir	160	Dela Costa Homes IV Subdivision	TO 2006
30	53	Scottsdale/ Verde Heights (Kaypian) Subdivision	Elevated Steel Reservoir		Scottsdale and Verde Heights (Kaypian) Subdivision, Brgy. Kaypian	TO 2010
31	55	North Ridge Executive, Brgy. Sto. Cristo, CSJDM, Bulacan	Ground Steel Reservoir	227	Tierra Del Sueño Subdivision, Brgy. Sto. Cristo	TO 2005

32	56	Block 4 Phase 1 North Gate Park Executive, Brgy. Sto. Cristo, CSJDM, Bulacan	Ground Steel Reservoir	320	North Gate Park Executive, Brgy. Sto. Cristo	TO 2002
33	57	Tank 1 Block 28 Phase I Towerville Subdivision	Elevated Steel Reservoir	170	Towerville Subdivision, Brgy. Sto. Cristo	TO 2002
34	58	Tank 2 Block 44 Phase I Towerville Subdivision	Elevated Steel Reservoir	150	Towerville Subdivision, Brgy. Sto. Cristo	TO 2002
35	59	Tank 3 Block 10 Phase 4A Towerville Subdivision	Elevated Steel Reservoir	150	Towerville Subdivision, Brgy. Sto. Cristo	TO 2002
36	60	Tank 4 Block 23 Phase 4A Towerville Subdivision	Elevated Steel Reservoir	150	Towerville Subdivision, Brgy. Sto. Cristo	TO 2002
37	61	Tank 5 Block 34 Phase 4 Towerville Subdivision	Elevated Steel Reservoir	150	Towerville Subdivision, Brgy. Sto. Cristo	TO 2002
38	62	Sump Tank No. 1, Blk 23 Phase I Towerville Subdivision	Underground Reinforced Concrete Reservoir	60	Towerville Subdivision, Brgy. Sto. Cristo	TO 1998
39	63	Sump Tank No. 2 Blk. 7 Phase 2 Towerville Subdivision	Ground Steel Reservoir	250	Towerville Subdivision, Brgy. Sto. Cristo	TO 2002
40	64	Area I Brgy. Sto. Niño Sapang Palay, Bulacan	Ground Steel Reservoir	980	Brgys. Sto. Niño, Lawang Pare, Assumption, San Martin De Porres, and San Martin	1984-2001
41	65	B 5 L 12 Carissa Home Phase 6 Subdivision Brgy. Sto. Cristo, CSJDM, Bul.	Ground Steel Reservoir	378	Carissa 6 Subdivision Brgy. Sto. Cristo, Brgys. Kaybanban, San roque, Paradise III, and San Isidro.	TO 2008

42	66	NorthRidge Prime Estate Subdivision Brgy. Sto. Cristo, CSJDM, Bulacan	Ground Steel Reservoir	303	Prime Estate Subdivision, Camella Sueño, Tierra Del Sueño Heights, Brgy. Sto. Cristo	TO 2008
43	67	Palmera Northwinds City Phase I Subdivision, Brgy. Kaypian, CSJDM, Bulacan	Ground Steel Reservoir	500	Palmera Northwinds I Subdivision	2010
44	68	Brgy. San Roque	Elevated Steel Reservoir		Brgys. San Roque, Paradise III, and San Isidro	2011
45	69	B 20 Colinas Verdes Subdivision, Brgy. Tungkong Mangga, CSJDM, Bulacan	Gound Steel Reservoir w/ Liner	800	Colinas Verdes	2010
46	70	NorthHills Subdivision, Brgy. Kaypian, CSJDM, Bulacan	Elevated Steel Reservoir	50	Palmera NorthHills Subdivision, Brgy. Kaypian	TO 2010
47	71	MetroGate Subdivision, Brgy. Proper, CSJDM, Bulacan	Ground Steel Reservoir	800	Brgys. Fatima, Proper, Dulong Bayan and Muzon	2010
48	72	Blk 6 L 9 and B 1 L 7 Pecsonville Subdivision, Brgy. Tungkong Mangga, CSJDM, Bulacan	Elevated Steel Reservoir	189	Pecsonville Subdivision, Brgy. Tungkong Mangga	TO 2006
49	73	Blk. 12 Lot 33,35 North Ridge Classic Subdivision, Brgy. Sto, Cristo, CSJDM, Bul.	Ground Steel Reservoir	454	North Ridge Classic Subdivision, Brgy. Sto, Cristo	TO 2006
50	74	Brgy. Paradise 3	Elevated Steel Reservoir	76	Brgys. Paradise III, San Roque, and San Isidro	Transferred Oct 2011
51	75	Brgy. San Isidro	Elevated Steel Reservoir	57	Brgy. San Isidro	Transferred Oct 2014
52	76	Sump Tank 3 Phase 4B Towerville Subd. CSJDM Bul.	Underground Reinforced Concrete Reservoir		Towerville Subdivision, Brgy. Sto. Cristo	TO 2009

53	77	Tank 6 Phase 4B Towerville Subdivision	Elevated Steel Reservoir	150	Towerville Subdivision, Brgy. Sto. Cristo	TO 2009
54	78	Tank 7 Phase 5 Towerville Subd. CSJDM Bul.	Elevated Steel Reservoir	150	Towerville Subdivision, Brgy. Sto. Cristo	TO 2009
55	79	Tank 8 Phase 5 Towerville Subd. CSJDM Bul.	Elevated Steel Reservoir	150	Towerville Subdivision, Brgy. Sto. Cristo	TO 2009
56	Citrus	Citrus Area G, Sapang Palay, CSJDM, Bulacan	Underground Reinforced Concrete Reservoir Underground Reinforced Concrete Sedimentation Basin	350 950	Brgys. Minuyan, Citrus, Lawang Pare, Sto. Niño, San Martin de Porres, Assumption, San Martin, Sta. Cruz, San Rafael, Bagong Buhay, Fatima, San Pedro, and Dulong Bayan	1966
57	Fresh Air	Road 3 Area A Sapang Palay, Bulacan Minuyan II Sapang Palay, Bulacan	Underground Reinforced Concrete Reservoir Underground Reinforced Concrete Sedimentation Basin	455 950	Brgys. Minuyan, Citrus, Lawang Pare, Sto. Niño, San Martin de Porres, Assumption, San Martin, Sta. Cruz, San Rafael, Bagong Buhay, Fatima, San Pedro, Dulong Bayan, and Sto. Cristo	1966
58	WTP 1	Road 1, Minuyan, CSJDM, Bulacan	Underground Reinforced Concrete Reservoir	1100	Brgys. Minuyan, Citrus, Lawang Pare, Sto. Niño, San Martin de Porres, Assumption, San Martin,	

					Sta. Cruz, San Rafael, Bagong Buhay, Fatima, San Pedro, and Dulong Bayan	1997
59	WTP 2	Road 1, Minuyan, CSJDM, Bulacan	Underground Reinforced Concrete Reservoir	1800	Whole Non-Area Subsystem and part of Sto. Cristo Subsystem	2007
60	80	Estrella Subdivision III Brgy. Gaya-Gaya CSJDM, Bul.	Elevated Steel Reservoir	132	Estrella Subdivision III Brgy. Gaya-Gaya	2006
61	81	Villa Muzon, Brgy. Muzon, CSJDM, Bul.	Ground Steel Reservoir	378	Villa Muzon, Brgy. Muzon	2007
62	82	B 1 L 36 and 37 University Heights, Brgy. Kaypian CSJDM, Bul.	Elevated Steel Reservoir	95	University Heights, Brgy. Kaypian	2011
63	83	Palmera Northwinds 6A, Brgy. Kaypian, CSJDM, Bulacan	Ground Steel Reservoir	500	Palmera Northwinds 6A and 6B, Brgy. Sto. Cristo	2011
64	84	B 29 L 11 NorthRidge Drive, Brgy. Sto. Cristo, CSJDM, Bul.	Elevated Steel Reservoir	38	NorthRidge Classic Brgy. Sto. Cristo	2012
65	85	Grand Cypress Subdivision, Brgy. Tungkong Mangga, CSJDM, Bulacan	Elevated Steel Reservoir		Grand Cypress Subdivision, Brgy. Tungkong Mangga	2012
66	86	Highview Royale Subdivision	Elevated Steel Reservoir		Highview Royale Subdivision, Brgy. Sto. Cristo	TO 2006
67	87	Blk. 13 Francisco Homes 2 Subd. Brgy. Graceville, CSJDM, Bulacan	Elevated Steel Reservoir	227	Francisco Homes 2 Subd. Brgy. Graceville	TO 2012
68	88	Francisco Homes 3 Subd. Brgy. Muzon, CSJDM, Bulacan	Elevated Steel Reservoir	227	Francisco Homes 3 Subd. Brgy. Muzon	TO 2012
69	90	Villa Annapolis I, Brgy.	Ground Steel	180	Villa Annapolis,	2013

		Dulong Bayan, CSJDM, Bulacan	Reservoir w/ Liner		Brgy. Dulong Bayan	
70	91	San Jose del Monte Heights, Brgy. Muzon, CSJDM, Bulacan	Ground Steel Reservoir w/ Liner	1000	San Jose del Monte Heights, Brgy. Muzon	2014
71	92	Palmera Northwinds 2A, Bgy. Kaypian, CSJDM, Bulacan	Ground Steel Reservoir	500	Palmera Northwinds 2A, 5 & 3A	2015
72	95	Brgy. Paradise 3	Ground Steel Reservoir w/ Liner	80	Brgy. Paradise 3	2014
73	96	Brgy. San Isidro	Ground Steel Reservoir w/ Liner	80	Brgy. San Isidro	2014
74	97	B 13 L 10 and 11 Tierra Del Sueño Heights Subdivision, Brgy. Sto. Cristo, CSJDM, Bulacan	Ground Steel Reservoir	227	Tierra Del Sueño Heights Subdivision, Brgy. Sto. Cristo	TO 2015
75	98	Tierra Del Sueño Heights Subdivision	Ground Steel Reservoir w/ Liner	50	Tierra Del Sueño Heights Subdivision, Brgy. Sto. Cristo	TO 2015
76	99	Benjamin Village 3, Brgy. Sto. Cristo, CSJDM, Bulacan	Ground Steel Reservoir w/ Liner	125	Benjamin Village	TO 2015
77	100	B 14 L 1-c Villa Hermano, Brgy. Sto. Cristo CSJDM, Bulacan	Elevated Concrete Reservoir	151	Villa Hermano Subdivision	TO 2015
78	101	North Fairways Homes	Ground Steel Reservoir	302	North Fairways Homes	TO 2016
79	102	North Fairways Homes	Elevated Steel Reservoir	76	North Fairways Homes	TO 2016
80	103	Blk 1 Toyota Village	Elevated Steel Reservoir	37	Toyota Village, Brgy. Gayagaya	2013
81	104	Residencia de Muzon, Brgy. Muzon, CSJDM, Bulacan	Elevated Steel Reservoir	225	Residencia de Muzon Subdivision	2013
82	105	Partida, Norzagaray, Bulacan	Ground Steel Reservoir w/ Liner	300	Brgys. Fatima, San Pedro, San Rafael, Dulong Bayan, Muzon and	2016

					Graceville I	
83	106	Tierra Benita	Elevated Steel Reservoir	225	Tierra Benita Subdivision	TO 2015
84	107	Blancia St., Carriedo, Brgy. Muzon, CSJDM, Bulacan	Ground Steel Reservoir w/ Liner	1000	Lower Muzon	2018
85	108	Brgy. San Martin IV, Area C, Sapang Palay, CSJDM, Bulacan	Ground Steel Reservoir	675	Bgy. San Martin IV	2019
86	109	Tanawin Road, Brgy. Tungkong Mangga, CSJDM, Bulacan	Ground Steel Reservoir	2500	Bgys. Tunkong Mangga, San Manuel, Ciudad Real, Maharlika, Graceville, Gumaoc East, Gumaoc West, Gumaoc Central & Gaya Gaya	2019
87	110	Northridge Grove Subd., Brgy. Tungkong Mangga, CSJDM, Bulacan	Ground Steel Reservoir	500	Northridge Grove Subdivision	TO 2015
88	111	Northridge Royale Subd., Bgy. Sto. Cristo, CSJDM, Bulacan	Ground Steel Reservoir	500	Northridge Royale Subdivision	TO 2015
89	112	Carissa 2B, Bgy. Kaypian, CSJDM, Bulacan	Ground Steel Reservoir	500	Carissa 2B Subdivision	TO 2015
90	113	Palmera Northwinds 4B, Bgy. Kaypian, CSJDM, Bulacan	Ground Steel Reservoir	500	Palmera Northwinds 4B	TO 2015
91	114	Palmera Northwinds 4A, Bgy. Kaypian, CSJDM, Bulacan	Ground Steel Reservoir	500	Palmera Northwinds 4A	TO 2015
92	115	Palmera Northwinds 2B, Bgy. Kaypian, CSJDM, Bulacan	Ground Steel Reservoir	500	Palmera Northwinds 2B	TO 2015
93	116	Carissa 2A, Bgy. Kaypian, CSJDM, Bulacan	Ground Steel Reservoir	500	Carissa 2A & Palmera Northwinds 7	TO 2015

94	117	Carissa 1A, Bgy. Kaypian, CSJDM, Bulacan	Ground Steel Reservoir	500	Carissa 1A	TO 2015
95	118	Carissa 1B, Bgy. Kaypian, CSJDM, Bulacan	Ground Steel Reservoir	500	Carissa 1B,	TO 2015
96		Brgy. Donacion, Angat Bulacan	Ground Steel Reservoir w/ Liner	160	Brgys. Fatima, San Pedro, San Rafael, Dulong Bayan, Muzon and Graceville I	2013
97		Brgy. Encanto, Angat Bulacan	Ground Steel Reservoir w/ Liner	160	Brgys. Fatima, San Pedro, San Rafael, Dulong Bayan, Muzon and Graceville I	2013
98		Brgy. Pulong Yantok, Angat Bulacan	Ground Steel Reservoir w/ Liner	160	Brgys. Fatima, San Pedro, San Rafael, Dulong Bayan, Muzon and Graceville I	2013

B. Distribution

Water that are distributed by the San Jose Water/PW-SJDMC comes from different sources. These water sources come from the following: a) three (3) water treatment plants, b) two (2) bulk water supply, and c) nine (9) deep wells.

A. Water Treatment Plant No.1 DistributionSystem

The three (3) water treatment plants are tapped to the aqueduct of MWSS.WTP1 and 2 are situated in one compound at Barangay Minuyan Proper, while WTP3 is situated at Brgy. Tungkong Mangga, CSJDM, Bulacan.

WTP 1 became operational last 1997 wherein the component of the water supply system project is the installation of transmission going to the five (5) reservoirs, three (3) of them are ground concrete reservoir and two ground steel tanks. The project was called Comprehensive Water Supply System Project Phase 1 (CWSSP 1). WTP 1 supplies water to SPRP Area.

The water from WTP No.1, at 56 m elevation, is being pumped to ground reservoir in Fresh Air Booster Station (FABS), at 116m elevation, through 400mmØ steel transmission line. There are two reservoirs in FABS, the rectangular settling basin with

950 cum capacity and the ground round reservoir rwith 455 cum capacity.

There are distribution lines tapped on said reservoir.250mmØ PVC transmission line was tapped on the rectangular reservoir to supply the Towerville Subdivsion in Brgy.Sto. Cristo and Brgy. Minuyan Proper.The transmission line conveys water to three (3) booster stations in Towerville Subdivision. Booster Station 1 has a ground settling basin with capacity of 60 cum. Aligned on settling basin are pumps to two (2) elevated steel tanks. Booster Station No. 2 has a ground steel tank pumping water to other elevated steel tanks of the said subdivision.

Another 200mmØ distribution line is tapped on the ground round reservoir that serves water to the lowest part of Brgy.Minuyan by gravity. Other water from Fresh Air Booster Station is being pumped to Citrus BoosterStation, at 146.68m elevation through a 400mmØ steel transmission line. Citrus Booster Station has two ground reservoirs: settling basin with 950 cum capacity and underground reservoir with 303cum. In rectangular settling basin there are two distributions interconnected from it. First, there are 200mmØ and 300mmØ transmission lines going to the elevated steel tank in Area E (Res. No. 4) and at Sampol Area in AreaB respectively. Second, an abandoned 150mm Ø transmission line from Minuyan to Citrus was converted into distribution line. Instead of conveying water from Minuyan directly to Citrus (as used in the water system before), the converted distribution line (that was interconnected to the distribution lines of Minuyan) is now augmenting the needs of the residents in some part of Brgy.Minuyan and Quarry Area.

Another 150mmØ line was interconnected to underground reservoir. From the underground reservoir there are lines tapped on it: the 1.) 100mm Ø distribution line supplying the upper parts of Brgy.Minuyan by gravity, 2.) The 150mm Ø transmissionline

being boosted to Brgy. Sto. Nino II Ground Steel Reservoir, and 3) 75mmØ linegoing to the elevated steel tank inside CBS.The water is being pumped to the elevated tank to supply upper portion of Brgy.Citrus

Sto. Niño II steel ground reservoir and Reservoir No.4 collects water and distributes it by gravity. Sto Niño II reservoir, with 157.86m elevation and Res. No. 4 has the same fill-and-draw system.

The distribution lines under the WTP No. 1 water system ranges from 50mmØ to 200mm Ø of PVC and PE pipes. The system was interconnected to the system developed by the National Housing Authority way backlate 60's. The NHA watersystem is comprised of different types of pipes such as PVC, GI pipe, steel pipe, and Asbestos Cement Pipe (ACP)ishe CWWSP 1 is also interconnected to Angat Bulk Water Supply Project which will be tackled later.

B. Water Treatment Plant No.2 Distribution System

WTP 2 was activated last 2006. It supplies water to the Non-Area operation with 3,900 lm 600mm Ø steel transmission line going to Igay Reservoir, with 153.62 m elevation, at Brgy.Sto Cristo.The reservoir has a1,400 cum capacity.

Water from Igay Reservoir is delivered by gravity to the barangays of Tungkong Mangga, San Manuel, Maharlika, Graceville, Gaya-gaya, Kaypian, Poblacion, Poblacion1, Muzon, Mulawin, Guijo, Narra, Yakal, Dulong Bayan, and some portions of Sto Cristo.

Other barangays such as Kaybanban, San Roque, Brgy. Paradise III and

SanIsidro get their water from Igay Reservoir through another booster stations in Brgy. SanRoque, Brgy. Paradise and BrgyIsidro.Elevated steel tanks were erected in Brgy Paradise and San Isidro to reach the highest portions of the service areas.

Like WTP 1 the WTP 2 also has pipeline component when it was constructed. It was named Comprehensive Water Supply Sytem Project Phase 2. The distribution that started in Igay Reservoir started from 400mmØ PVC, 300mmØ PVC, 250mmØ PVC,200mmØ PVC, and 150mmØ PVC.There are portions wherein 100mmØ and 50mmØ parallel distribution lines were also laid.

C. Water Treatment Plant No. 3 Distribution System

WTP3 is situated inside the Grand Cypress Subd at Brgy. Tungkong Mangga and started its operation December of 2018. Water from WTP No. 3 is being pumped directly into the distribution line through the 250mmØ interconnection point across Grand Cypress Subdivision. The treated water is pumped, augmented, and add pressure and water volume in the barangays of Tungkong Mangga, San Manuel, Maharlika, Graceville and Gaya-gaya.

D. Angat Bulk Water Supply System

The Angat Bulk Water Supply System Project (ABWSSP) was completed last 2014 with a total length of 16,553.28m-400mmØ transmission line from Brgy. Donacion, Angat, Bulacan to Metrogate San Jose Subdivision, Brgy. Sapang Palay Proper in the City of San Jose Del Monte, Bulacan.

The water that being supplied is coming from a private company selling water to the water district. The owner has twelve (12) deep wells in Brgy. Donacion, Angat, Bulacan.The company treated water through chlorination.

The water from Brgy Donacion is being pumped to the booster station in Brgy.

Encanto, Angat, Bulacan with 48.20m elevation. Encanto Booster Station (EBS) has a ground steel reservoir and four (4) booster pumps. The water in Encanto will then be pumped to another booster station in Brgy. PulongYantok, Angat.The same with booster station in Brgy. Encanto the Pulong Yantok Booster Station (PYBS) has also ground steel reservoir and four (4) booster pumps. It will then pump to ground steel reservoir in Metrogate San Jose Subdivision in Brgy. Sapang Palay Proper, City of San Jose del Monte, Bulacan.

Metrogate Booster Station (MBS) also has four (4) booster pumps. The Metrogate Booster Station is also interconnected to Res. No. 4, Res. No. 5, and the newly constructed 675 cum steel welded tank at Brgy. Sta. Cruz IV which augment the water requirement of the concessionaires in Sapang Palay areas. The interconnection of MBS to the water system of Sapang Palay makes it BWSSP interconnected to CWSSP No.1.

MBS also pumps water to Kelsey Hills reservoir in Brgy. Muzon through the 7,888lm 400mmØ transmission line. Before reaching Kelsey Hills Subd., other subdivisions water systems have been interconnected to the Metrogate-KelseyHills transmission line. Sarmiento Homes Subd., Villa Espanola, Villa Muzon, Villa Muzon Classique and the new NHA housing at San Jose del Monte Heights Subdivision, Samahan ng Maralitang Pilipino and Green Heights Subdivision.

E. Distribution through Deep Wells

There are nine (9) active deep wells used in the operation. These deep well shave discharge lines interconnected to the nearest distribution line. Basically, the water

is treated through chlorination prior to distribution.

Other areas augmented by existing deep wells are:

1. Francisco Homes 1
2. Pabahay2000
3. FranciscoHomes2
4. DulongBayan
5. EvergreenHeights
6. Verde Heights (Brgy.Kaypian)
7. Dela Costa Homes 3

Water from Angat Dam which passes through MWSS Aqueduct No. 6 is being treated at San Jose Water's three (3) WaterTreatment Plants.

Water from WTP No. 1 is being pumped to a ground reservoir in Fresh Air Booster Station (FABS). It will be collected and stored at Sto Niño II steel ground reservoir and Reservoir No. 4 and distributed to the concessionaires of SPRP Area by gravity.

WTP 2 supplies water to Non-Area. The treated water is transmitted and stored at Igay Reservoir. Water from Igay Reservoir is delivered by gravity to the barangays of Kaypian, Poblacion, Poblacion 1, Muzon, Mulawin, Guijo, Narra, Yakal, Dulong Bayan, and some portions of Sto Cristo.

Water from WTP No. 3 is being pumped directly into the distribution line through the 250mmØ interconnection point across Grand Cypress Subdivision. The treated water is

pumped, augmented, and add pressure and volume to the barangays of Tungkong Mangga, San Manuel, Maharlika, Graceville and Gaya-gaya.

Other barangays such as Kaybanban, San Roque, Brgy. Paradise III and San Isidro gettheir water from Igay Reservoir through another booster stations in Brgy. San Roque, Brgy.Paradise and Brgy Isidro.Elevated steel tanks were erected in Brgy Paradise and San Isidro to reach the highest portions of the service areas.

Treated water from ABWSSP passes through transmission lines from Brgy. Donacion, Angat, Bulacan to Metrogate San Jose Subdivision, Sapang Palay Proper in San Jose Del Monte. The water that is being supplied is coming from a private company selling water to the water district. Water that is supplied by ABWSSP augments the water requirement to the concessionaires in Brgy.Muzon and some areas in SPRP.

Also, treated water being supplied by Luzon Clean Water Development Corporation (Bulacan Bulk) is received by the 2500 cum steel welded tank at Amihan Rd, Brgy. Tungkong Mangga. The 1000mm dia steel pipe and 150mm dia distribution parallel pipe convey water from this 2500 cum tank to Tungko Crossing by means of gravity.

The diagram on the next page illustrates the description of San Jose Del Monte City Water District Water Supply System.

Water Sources
Groundwater Sources

Name of Pumping Station / Well No.	PS # 13
Location	Phase 1, Ciudad Real Subdivision, CSJDM, Bulacan
Well Depth	140m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	7.5hp / 230V SP 8A - 27
Average Actual extraction rate (lps)	4.30 LPS
Areas where supply is Distributed	Ciudad Real Subdivision
Operating Hours	18 hrs per day
Riser Pipe	2" dia. SP
Pump Setting (m)	102m
Static Water Level (m)	48.6m
Activity within 250m radius	Residential Area, Church

Name of Pumping Station / Well No.	PS # 19
Location	Japan St. Harmony Hills Subd., CSJDM, Bulacan
Well Depth	150m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 30 - 10
Average Actual extraction rate (lps)	8.33 LPS
Areas where supply is Distributed	Harmony Hills Subdivision
Operating Hours	Standby
Riser Pipe	3" dia. SP
Pump Setting (m)	120m
Static Water Level (m)	33.5m
Activity within 250m radius	Residential Area, Church

Name of Pumping Station / Well No.	PS # 20
Location	Lot 23 Morning Glory Subd., Dulong Bayan, CSJDM, Bulacan
Well Depth	180m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 45 - 8
Average Actual extraction rate (lps)	10.67 LPS
Areas where supply is Distributed	Bgy. Dulong Bayan
Operating Hours	24 hrs per day
Riser Pipe	4" dia. SP
Pump Setting (m)	91.44m
Static Water Level (m)	48.7m
Activity within 250m radius	Residential Area, Industrial Livestock Feed Production,

Name of Pumping Station / Well No.	PS # 22
Location	B10 Phase 1, Evergreen Heights Subd., CSJDM, Bulacan
Well Depth	200m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 45 - 8
Average Actual extraction rate (lps)	7.05 LPS
Areas where supply is Distributed	Evergreen Heights Subdivision
Operating Hours	Standby
Riser Pipe	3" dia. SP
Pump Setting (m)	84m
Static Water Level (m)	19m
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	PS # 24
Location	Block 106 Melody Plains Subd., CSJDM, Bulacan
Well Depth	150m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 46 - 9
Average Actual extraction rate (lps)	8.58 LPS
Areas where supply is Distributed	Melody Plains Subdivision & Pabahay 2000
Operating Hours	24 hrs per day
Riser Pipe	3" dia. SP
Pump Setting (m)	108m
Static Water Level (m)	59.08m
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	PS # 26
Location	B3 L13 Phase E2, Francisco Homes Subd., CSJDM, Bulacan
Well Depth	184m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 46 - 9
Average Actual extraction rate (lps)	6.46 LPS
Areas where supply is Distributed	Bgy. Yakal & Bgy. Mulawin
Operating Hours	Standby
Riser Pipe	3" dia. SP
Pump Setting (m)	96m
Static Water Level (m)	41m
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	PS # 27
Location	B17 L1 S7 Phase 1, Pabahay 2000, CSJDM, Bulacan
Well Depth	183m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 46 - 9
Average Actual extraction rate (lps)	12.43 LPS
Areas where supply is Distributed	Pabahay 2000
Operating Hours	24 hrs per day
Riser Pipe	3" dia. SP
Pump Setting (m)	108m
Static Water Level (m)	57.25m
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	PS # 28
Location	Block 5 Sarmiento Homes Subd., CSJDM, Bulacan
Well Depth	190m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 46 - 11
Average Actual extraction rate (lps)	9.53 LPS
Areas where supply is Distributed	Pabahay 2000
Operating Hours	18 hrs per day
Riser Pipe	3" dia. SP
Pump Setting (m)	108m
Static Water Level (m)	42m
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	PS # 29
Location	M. H. Del Pilar St., Ciudad Real Village, CSJDM, Bulacan
Well Depth	180m
Well Case Diameter (mm)	150mm dia. (89 – 185m)
Motor Installed Rating (hp)	5hp / 230V SP 8 – 15
Average Actual extraction rate (lps)	2.65 LPS
Areas where supply is Distributed	Ciudad Real Subdivision
Operating Hours	12 hrs per day
Riser Pipe	3" dia. SP
Pump Setting (m)	84m
Static Water Level (m)	NA
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	PS # 36
Location	B3 L13 P5, Pleasant Hills Subd., Brgy. San Manuel, CSJDM, Bulacan
Well Depth	173m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 30 - 12
Average Actual extraction rate (lps)	9.65 LPS
Areas where supply is Distributed	Pleasant Hills Subdivision
Operating Hours	Standby
Riser Pipe	3" dia. SP
Pump Setting (m)	120m
Static Water Level (m)	96.82m
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	PS # 40
Location	Daang Barrio, Gaya-Gaya, CSJDM, Bulacan
Well Depth	200m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 30 - 11
Average Actual extraction rate (lps)	8.77 LPS
Areas where supply is Distributed	Daang Barrio
Operating Hours	Standby
Riser Pipe	3" dia. SP
Pump Setting (m)	84m
Static Water Level (m)	49m
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	PS # 45
Location	B14, Dela Costa Homes III Subd., P3, Tungkong Mangga, CSJDM, Bulacan
Well Depth	170m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 30 - 11
Average Actual extraction rate (lps)	8.77 LPS
Areas where supply is Distributed	Daang Barrio
Operating Hours	Standby
Riser Pipe	3" dia. SP
Pump Setting (m)	108m
Static Water Level (m)	120m
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	PS # 53
Location	Block 15 Lot 29 Verde Heights, Kaypian, CSJDM, Bulacan
Well Depth	200m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 46 - 9
Average Actual extraction rate (lps)	7.21 LPS
Areas where supply is Distributed	Scottsdale Subdivision, University Heights & Bgy. Kaypian
Operating Hours	16 hrs per day
Riser Pipe	3" dia. SP
Pump Setting (m)	102m
Static Water Level (m)	41.5m
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	PS # 54
Location	Francisco Homes 2, CSJDM, Bulacan
Well Depth	190m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 46 - 9
Average Actual extraction rate (lps)	6.20 LPS
Areas where supply is Distributed	Francisco Homes II, Dela Costa Homes IV & SRCC Gardenville
Operating Hours	18 hrs per day
Riser Pipe	3" dia. SP
Pump Setting (m)	84m
Static Water Level (m)	33m
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	Carissa 2A
Location	80001 GS Carissa Homes II-A St., Carissa Homes North 2A, Sto. Cristo, CSJDM, Bulacan
Well Depth	
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 46 - 9
Average Actual extraction rate (lps)	NA
Areas where supply is Distributed	Carissa 2A
Operating Hours	Standby
Riser Pipe	3" dia. SP
Pump Setting (m)	
Static Water Level (m)	
Activity within 250m radius	Residential Area

Name of Pumping Station / Well No.	Carissa 2B
Location	80001 GS Carissa Homes North 2B, Sto. Cristo, CSJDM, Bulacan
Well Depth	190m
Well Case Diameter (mm)	200mm dia. (89 – 185m)
Motor Installed Rating (hp)	30hp / 230V SP 46 - 9
Average Actual extraction rate (lps)	6.20 LPS
Areas where supply is Distributed	Carissa 2B & North Ridge Royale
Operating Hours	12 hrs per day
Riser Pipe	3" dia. SP
Pump Setting (m)	
Static Water Level (m)	103m
Activity within 250m radius	Residential Area

Figure 7 – Description of SanJose Water/ PW-SJDMC Water Supply System

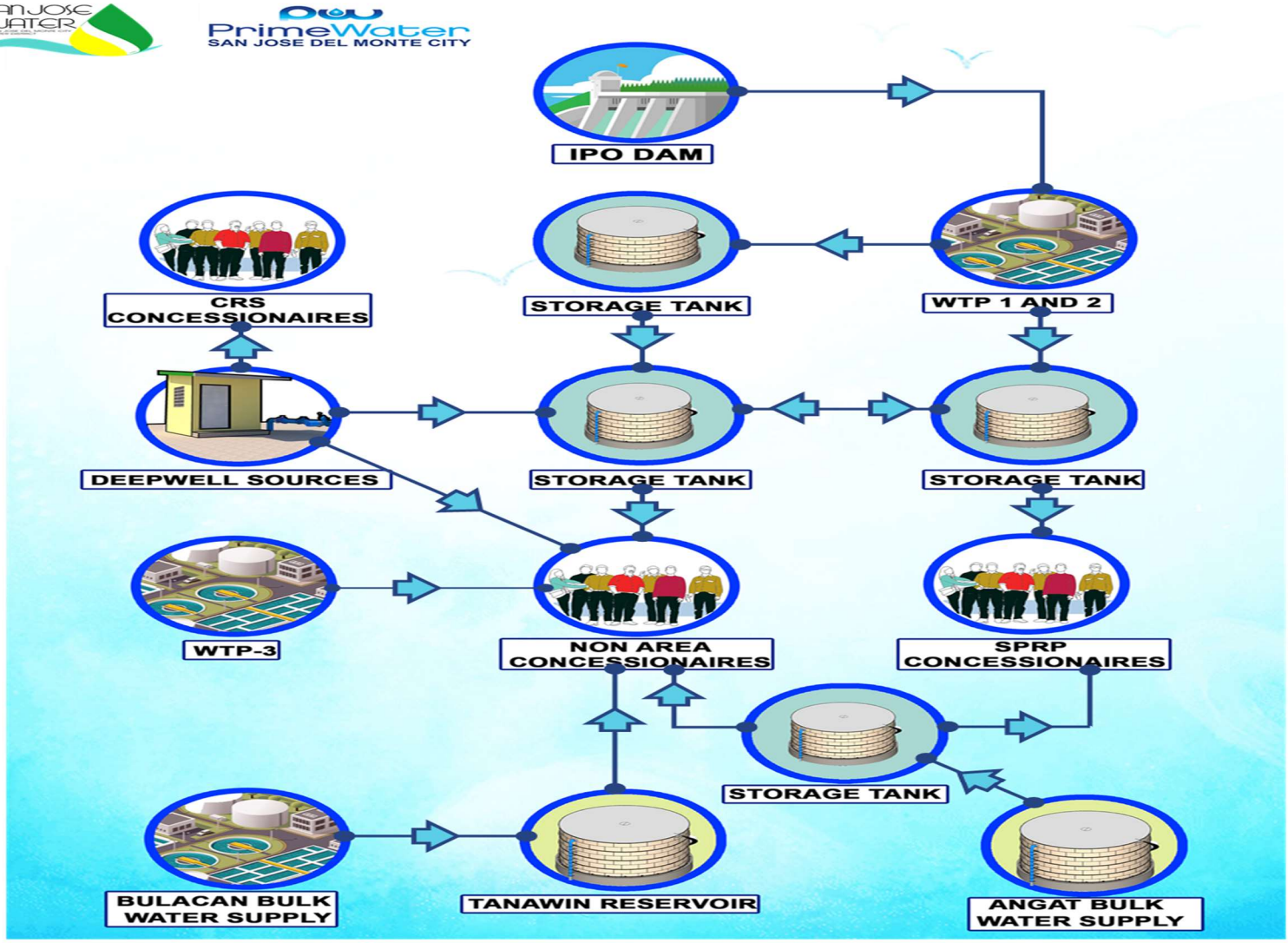


Figure 8 – Process Flow of WTP No.1 and 2

A. WATER TREATMENT PLANT 1 AND 2

Process Step	Symbol		Responsible Department/Section
	WTP1	WTP2	
Raw Water Supply from Angat River via MWSS Aqueduct No.6			WTP-WQMS
Receiving Raw Water in Inlet Chamber where Flow is regulated via positioner Butterfly Valve			WTP-WQMS
Prechlorination using Gas (with LCH as back up)			WTP-WQMS
Coagulation and Flash Mixing where PAC is applied as coagulant			WTP-WQMS
Raw Water Screening for WTP2			WTP-WQMS
Flocculation where polymer is added	Recovery	Recovery	WTP-WQMS
Sedimentation (Sludge Blanket Clarifier Pulsator for WTP1 and Conventional Sedimentation for WTP2)			WTP-WQMS
Sludge Extraction, draw off into the Lagoon			WTP-WQMS
Middle chlorination			WTP-WQMS
Filtration			WTP-WQMS
Backwash Water to Wash Water Recycling Tank for WTP1 and Sludge Separation Tank for WTP2			WTP-WQMS
Sludge Detention into the Lagoon			WTP-WQMS
Post-chlorination using LCH (with Gas as back up)			WTP-WQMS
Storage			WTP-WQMS
Transport to Highest Reservoir	B	A	Water Distribution Section
Storage			Water Distribution Section
Distribution			Water Distribution Section
Concessionaire			Water Distribution Section

Figure 9 – Process Flow of Angat Bulk Water Supply System Project

B.BULK WATER

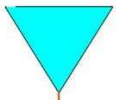
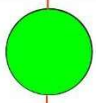
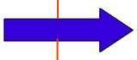
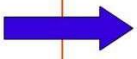
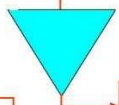
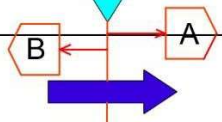
Process Step	Symbol	Responsible Department/Section
Well		Private Bulk Water Supplier
Chlorination		Private Bulk Water Supplier
Transmission to Booster Station		Private Bulk Water Supplier
Booster Station		Bulk Water Supply Division
Transmission to Reservoir		Bulk Water Supply Division
Storage		Bulk Water Supply Division
Distribution Line		Water Distribution Section
Concessionaire		Water Distribution Section

Figure 10 – Process Flow of Bulacan Bulk Water Supply System Project

C. BULACAN BULK WATER SUPPLY

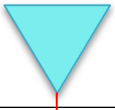
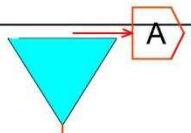
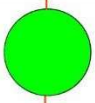
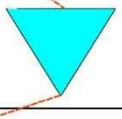
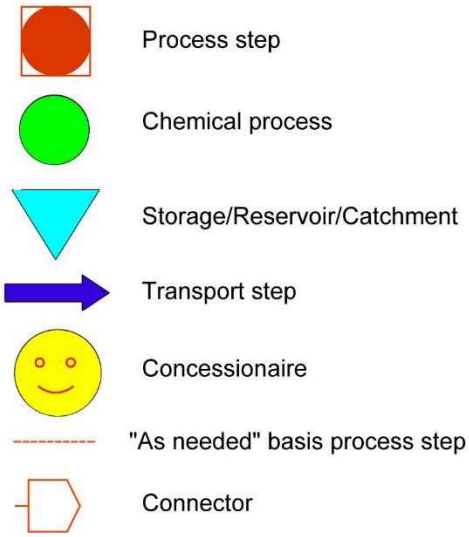
Process Step	Symbol	Responsible Department/Section
Raw water supply from Angat Dam via MWSS Aqueduct No. 6		Private Bulk Supplier
Treatment/Process		Private Bulk Supplier
Booster Station		Private Bulk Supplier
Transmission to Reservoir		Private Bulk Supplier
Reservoir		Water Distribution Section
Distribution Line		Water Distribution Section
Concessionaire		Water Distribution Section

Figure 11 – Process Flow of Ground Water

Process Step	Symbol	Responsible Department/Section
Well		Water Distribution Section
Chlorination		Water Distribution Section
Distribution Line		Water Distribution Section
Reservoir		Water Distribution Section
Concessionaire		Water Distribution Section

Legend:



F. Stakeholders

It is very necessary for San Jose Water/PW-SJDMC to maintain harmonious relationship and close coordination with its stakeholders. The amiable partnership will not only benefit both parties but most of all, the people they serve.

As its regulatory body, San Jose Water/PW-SJDMC submits monthly water quality report to Local Water Utilities Administration.

MWSS Aqueduct No. 6 serves as a link between San Jose Water and MWSS because this is where the San Jose Water/PW-SJDMC gets its raw water supply. San Jose Water has a total raw water allocation of 80,000 cmd from MWSS. The allocated raw water supply comes from Angat Dam. To date, San Jose Water/PW-SJDMC gets close to 71,600 cmd of raw water through MWSS Aqueduct No. 6 which passes adjacent to the Water Treatment Plant Compound of San Jose Water and Grand Cypress Subd., Brgy. Tungkong Mangga, CSJDM, Bulacan.

To establish conformity to environmental standards, San Jose Water/PW-SJDMC reports to the Department of Environment and Natural Resources (DENR) regarding its effluent quality. SanJose Water/PW-SJDMC makes sure that the environment is being conserved and protected to guarantee that adequate water supply will still be available to future generations.

San Jose Water/PW-SJDMC coordinates with the City Health Office, City Engineer's Office and the Department of Public Works and Highways especially during pipe laying, maintenance works, distribution line repairs and the like. Likewise, these offices may also seek the support of SanJoseWater/PW-SJDMC when the need arises.

San Jose Water/PW-SJDMC also established close connections with key suppliers for water treatment, MERALCO and other major suppliers to mitigate water interruption should their services fail to meet the requirements needed by San Jose Water to operate and/or their services disrupt the operation of the latter.

A stable partnership was also built between San Jose Water/PW-SJDMC and the Homeowners Association (HOA), Brgy.Officials, the Philippine National Police (PNP) and the households near the facilities of San Jose Water to guarantee the security of its properties against adversaries.

Intended Users of the Water

1. The water being supplied is intended for the general population.

2. The water is not intended for immuno-compromised persons.

Intended Uses of the Water

1. The water being supplied is intended for general domestic use and consumption by:

    a. Ingestion by drinking and food preparation.

    b. Dermal exposure through washing of bodies, and handwashing of clothes, utensils, etc.

2. Water is not intended for pharmaceutical use.

3. The water may need additional treatment process to suit industrial use

Water Quality

To ensure that the SJDMCWD-PWIC Quality Policy statement is met, the company assures that the water being distributed throughout its service area is safe and reliable. Aside from chlorination, the company, through its Roving Operators, regularly conducts line flushing to its covered areas. To regularly monitor the SJDMCWD -PWIC water quality, The Water Quality Section collects from concessionaires' tap with an average of 90 samples a month for Bacteriological Test and 2 samples from each water sources for Physical and Chemical Test semi-annually which is more than the required samples of Philippine National Standards for Drinking Water 2017.

Bacteriological Water analysis for Total and Fecal Coliform is done using either of the two methods, the Multiple Tube Fermentation Technique (MTFT) and Chromogenic Enzyme Substrate Technique (Colilert-18). To further check the effectivity of the company's water treatment, Heterotrophic Plate Count is also analyzed. This is in accordance with PNSDW 2017. Physical and Chemical analysis is done semi-annually and analyzed by various DOH accredited Water Laboratories.

PARAMETERS	***METHOD***
Turbidity	Turbidimetry
Apparent Color	Visual Comparison
pH	Electrometry
Total Dissolved Solids	Electrometry
Sulfate	Spectrophotometry
Nitrate	Spectrophotometry
Chloride	Spectrophotometry
Benzene*	Gas Chromatography and Mass Spectrometry
Iron	Direct Flame AAS
Manganese	Direct Flame AAS
Arsenic	HVG-AAS
Cadmium	Direct Flame AAS
Lead	Direct Flame AAS
Appearance	Visual Analysis

2.13 Water Quality Data (2017-2020)

2022 (SECOND HALF) PHYSICAL AND CHEMICAL RESULT

Pump Stations	Arsenic	Cadmium	Lead	Nitrate	Apparent Color	Turbidity	pH	Total Dissolved Solids	Iron	Manganese	Residual Chlorine
	0.010 ppm	0.003 ppm	0.01 ppm	50	5 CU	5 NTU	6.5-8.5	500/10*	1.0 ppm	0.4 ppm	0.3-1.5ppm
ANGAT BULK	ND	0.0001	ND	3.74	0	0.05	7.01	280	ND	0.03	0.78
BUL. BULK	ND	0.0001	ND	4.12	0	0.05	7.33	110	ND	ND	0.58
PS13	ND	0.0001	ND	10.98	0	0.05	8.16	320	ND	ND	1.02
PS20	ND	0.0001	ND	8.06	0	0.05	7.63	320	ND	ND	0.44
PS22	ND	0.0001	ND	3.35	0	2.85	6.79	120	ND	ND	0.44
PS 24	ND	0.0001	ND	24.3	5	0.05	7.63	330	ND	ND	0.76
PS26	ND	0.0001	ND	3.49	0	2.13	6.74	130	ND	ND	0.46
PS27	ND	0.0001	ND	28.12	0	0.05	7.92	470	ND	ND	0.48
PS28	ND	0.0001	ND	2.89	0	0.05	7.89	130	ND	ND	0.77
PS29	ND	0.0001	ND	32.98	0	0.44	7.68	270	ND	ND	0.44
PS53	ND	0.0017	ND	8.96	0	0.05	7.63	290	ND	ND	0.5
PS54	ND	0.0001	ND	5.78	0	0.05	6.85	370	ND	ND	1.32
WTP1	ND	0.0003	ND	2.93	0	3.51	6.76	120	ND	ND	0.7
WTP2	ND	0.0005	ND	3.24	0	2.09	6.8	120	ND	ND	0.73
WTP3	ND	0.0001	ND	3.95	0	0.05	7.46	120	ND	ND	0.72

Note: **ND** – not detected by method **Red** - Results exceeded the PNSDW limit

2022 (FIRST HALF) PHYSICAL AND CHEMICAL RESULT

Pump Stations	Arsenic	Cadmium	Lead	Nitrate	Apparent Color	Turbidity	pH	Total Dissolved Solids	Residual Chlorine
	0.010 ppm	0.003 ppm	0.01 ppm	50	5 CU	5 NTU	6.5-8.5	500/10*	0.3-1.5ppm
ANGAT BULK	ND	0.00004	ND	28.72	0	0.03	7.22	100	0.39
WTP1	ND	0.00004	ND	40.47	0	0.04	7.39	260	0.3
WTP2	ND	0.00004	ND	31.48	0	0.03	7.59	100	0.3
WTP3	ND	0.00004	ND	37.43	0	0.04	7.6	100	0.41
BUL. BULK	ND	0.00004	ND	0	0	0.03	7.43	0	.32
PS13	ND	0.00004	ND	38.59	0	0.03	7.8	2700	
PS20	ND	0.0004	ND	44.43	0	0.03	7.36	100	0.41
PS22	ND	0.00004	ND	40.2	0	0.03	7.87	100	0.44
PS 24	ND	0.00004	ND	41.3	0	0.03	7.87	100	0.35
PS26	ND	0.00004	ND	30.53	0	0.03	7.71	100	0.33
PS27	ND	0.00004	ND	42.15	0	0.03	7.44	240	0.42
PS29	ND	0.00004	ND ND	47.6	0	0.03	7.4	2870	
PS53	ND	0.00004	ND	19.49	0	0.03	7.98	290	0.36
PS54	ND	0.00004	ND	36.18	0	0.03	7.64	370	0.53

Note: **ND** – not detected by method **Red** - Results exceeded the PNSDW limit

2021 (SECOND HALF) PHYSICAL AND CHEMICAL RESULT

Pump Stations	Arsenic	Cadmium	Lead	Nitrate	Apparent Color	Turbidity	pH	Total Dissolved Solids	Residual Chlorine
	0.010 ppm	0.003 ppm	0.01 ppm	50	5 CU	5 NTU	6.5-8.5	500/10*	0.3-1.5ppm
ANGAT BULK	ND	0.0004	ND	1.25	0	0.05	7.68	130	0.63
BUL. BULK	ND	0.0004	ND	1.37	0	0.05	6.69	30	0.55
PS13		0.0004	ND		0	0.05	7.88		0.58
PS20	ND	0.0004	ND	9.13	0	0.05	8.2	360	0.32
PS22	ND	0.0004	ND	1.36	0	0.05	7.67	370	0.43
PS 24	ND	0.0004	ND	1.29	0	0.05	7.96	130	0.37
PS27	ND	0.0004	ND	1.56	0	0.05	8.13	90	0.34
PS28		0.0004	ND		0	0.05	7.46		0.42
PS29	ND	0.0004	ND	3.78	0	0.05	8.17	435	0.46
PS53	ND	0.0004	ND	1.56	0	0.05	8.43	130	0.45
PS54	ND	0.0004	ND	2.29	0	0.05	7.63	160	0.91
WTP1	ND	0.0004	ND	2.29	0	0.05	6.98	160	0.68
WTP2	ND	0.0004	ND	1.4	0	0.05	6.51	115	0.7
WTP3	ND	0.0004	ND	1.25	0	0.05	7.68	130	0.63

Note: **ND** – not detected by method **Red** - Results exceeded the PNSDW limit

2021 (FIRST HALF) PHYSICAL AND CHEMICAL RESULT

Pump Stations	Arsenic	Cadmium	Lead	Nitrate	Apparent Color	Turbidity	pH	Total Dissolved Solids	Residual Chlorine
	0.010 ppm	0.003 ppm	0.01 ppm	50	5 CU	5 NTU	6.5-8.5	500/10*	0.3-1.5ppm
ANGAT BULK	ND	ND	ND	17	0	0.05	7.72	275	1.1
BUL. BULK	ND	ND	ND	1.2	0	0.05	7.57	110	1.4
PS13	ND	ND	ND	1.25	0	0.05	8.04	100	1.2
PS22	ND	ND	ND	1.25	0	0.05	8.37	90	1.0
PS 24	ND	ND	ND	6.2	0	0.05	7.9	340	1.4
PS28		ND	ND		0	0.05	7.73		1.1
PS29	ND	ND	ND	4.9	0	0.05	7.54	380	0.9
PS53	ND	ND	ND	4.6	0	0.05	7.83	140	0.7
PS54	ND	ND	ND	4.4	0	0.05	7.84	140	1.0
WTP1	ND	ND	ND	12	0	0.05	8.37	600	1.2
WTP2	ND	ND	ND	10	0	0.05	8.5	600	1.1
WTP3	ND	ND	ND	7.1	0	0.05	7.88	380	0.3

Note: **ND** – not detected by method **Red** - Results exceeded the PNSDW limit

2020 (SECOND HALF) PHYSICAL AND CHEMICAL RESULT

Pump Stations	Arsenic	Cadmium	Lead	Nitrate	Apparent Color	Turbidity	pH	Total Dissolved Solids	Residual Chlorine
	0.010 ppm	0.003 ppm	0.01 ppm	50	5 CU	5 NTU	6.5-8.5	500/10*	0.3-1.5ppm
ANGAT BULK	ND	ND	ND	0.23	0	0.05	7.28	253	0.4
BUL. BULK	ND	ND	ND	0.23	0	0.05	7.87	127	0.5
Carissa 2A deepwell	ND	ND	ND	0.23	0	0.05	7.86	340	0.4
PS19	ND	ND	ND	0.23	0	0.05	7.6	125	0.5
PS20	ND	ND	ND	0.23	0	0.05	7.43	199	0.6
PS22	ND	ND	ND	0.23	0	0.05	8.0	331	0.6
PS 24	ND	ND	ND	0.23	0	0.05	7.34	122	0.3
PS26	ND	ND	ND	0.23	0	0.05	7.7	120	0.6
PS27	ND	ND	ND	0.23	0	0.05	8.35	443	0.4
PS28	ND	ND	ND	0.23	0	0.05	8.16	474	0.4
PS29	ND	ND	ND		0	0.05	8.18		0.8
PS36	ND	ND	ND	0.23	0	0.05	7.99	169	0.5
PS40	ND	ND	ND	0.23	0	0.05	7.64	174	0.5
PS45	ND	ND	ND	0.23	0	0.05	8.17	161	0.7
PS53	ND	ND	ND	0.23	0	0.05	7.65	145	0.5
PS54	ND	ND	ND	0.23	0	0.05	7.72	319	0.6
PS89	ND	ND	ND	0.25	0	2.63	7.33	234	0.4
WTP1	ND	ND	ND	0.33	0	0.05	7.53	130	0.3
WTP2	ND	ND	ND	0.23	0	0.05	7.57	128	0.3
WTP3	ND	ND	ND	0.23	0	0.05	7.74	136	0.3

Note: **ND** – not detected by method

Red - Results exceeded the PNSDW limit

2020 (FIRST HALF) PHYSICAL AND CHEMICAL RESULT

Pump Stations	Arsenic	Cadmium	Lead	Nitrate	Apparent Color	Turbidity	pH	Total Dissolved Solids	Residual Chlorine
	0.010 ppm	0.003 ppm	0.01 ppm	50	5 CU	5 NTU	6.5-8.5	500/10*	0.3-1.5ppm
ANGAT BULK	ND	ND	ND	ND	1		6.96	326	0.3
BUL. BULK	ND	ND	ND	ND	1	1	7.77	122	0.4
Carissa 2A deepwell	ND	ND	ND	ND	1	1	8.49	225	0.4
PS13	ND	ND	ND	ND	1	1	7.24	130	0.6
PS20	ND	ND	ND	ND	1	1	8.12	340	0.7
PS22	ND	ND	ND	ND	1	1	7.6	386	0.5
PS26	ND	ND	ND	ND	1	1	7.5	330	0.8
PS27	ND	ND	ND	ND	1	1	7.98	600	0.8
PS28	ND	ND	ND	ND	1	1	7.97	521	0.4
PS29	ND	ND	ND	ND	1	1	7.64	145	0.6
PS53	ND	ND	ND	ND	1	1	7.76	325	0.4
WTP1	ND	ND	ND	ND	1		7.37	120	0.5
WTP2	ND	ND	ND	ND	1		7.72	124	0.5
WTP3	ND	ND	ND	ND	1		7.52	115	0.8

Note: **ND** – not detected by method

Red - Results exceeded the PNSDW limit

2019 (SECOND HALF) PHYSICAL AND CHEMICAL RESULT

Pump Stations	Arsenic	Cadmium	Lead	Nitrate	Apparent Color	Turbidity	pH	Total Dissolved Solids	Residual Chlorine
	0.010 ppm	0.003 ppm	0.01 ppm	50	5 CU	5 NTU	6.5-8.5	500/10*	0.3-1.5ppm
ANGAT BULK	ND	ND	ND	ND	1	1	6.64	258	.04
Donacion/Moldex Treated	ND	ND	ND	ND	1	1	7.42	295	0.5
Palmera deepwell	ND	ND	ND	ND	1	1	6.67	589	0.4
PS13	ND	ND	ND	ND	1	1	7.17	279	
PS22	ND	ND	ND	ND	1	1	7.38	332	0.5
PS27	ND	ND	ND	ND	1	1	7.78	410	0.6
PS28	ND	ND	ND	ND	1	1	7.74	396	
PS29	ND	ND	ND	ND	1	1	7.32	299	0.5
PS36	ND	ND	ND	ND	1	1	7.3	104	0.4
PS40	ND	ND	ND	ND	1	1	7.73	370	
PS45	ND	ND	ND	ND	1	1	7.25	119	0.5
PS53	ND	ND	ND	ND	1	1	7.21	265	0.6
PS54	ND	ND	ND	ND	1	1	7.15	353	0.5
WTP1 & 2 Raw water	ND	ND	ND	ND	1	1	6.71	107	
WTP 1	ND	ND	ND	ND	1	1	7.23	132	0.6
WTP 2	ND	ND	ND	ND	1	1	7.11	123	0.7

Note: **ND** – not detected by method

Red - Results exceeded the PNSDW limit

2019 (FIRST HALF) PHYSICAL AND CHEMICAL RESULT

Pump Stations	Arsenic	Cadmium	Lead	Nitrate	Apparent Color	Turbidity	pH	Total Dissolved Solids	Residual Chlorine
	0.010 ppm	0.003 ppm	0.01 ppm	50	5 CU	5 NTU	6.5-8.5	500/10*	0.3-1.5ppm
ANGAT BULK	ND	ND	ND	ND	1	1	7.67	276	0.6
Donacion/Moldex Treated	ND	ND	ND	ND	1	1	7.58	241	0.8
PS13	ND	ND	ND	ND	1	1	8.29	119	
PS22	ND	ND	ND	ND	1	1	7.66	313	0.4
PS27	ND	ND	ND	ND	1	1	7.61	551	0.5
PS28	ND	ND	ND	ND	1	1	7.93	401	
PS36	ND	ND	ND	ND	1	1	7.5	122	0.4
PS40	ND	ND	ND	ND	1	1	7.54	374	
PS45	ND	ND	ND	ND	1	1	7.56	274	0.5
PS53	ND	ND	ND	ND	1	1	7.52	113	0.5
PS54	ND	ND	ND	ND	1	1	7.41	375	0.6
WTP1 & 2 Raw water	ND	ND	ND	ND	1	1	7.5	116	
WTP 1	ND	ND	ND	ND	1	1	7.63	117	0.6
WTP 2	ND	ND	ND	ND	1	1	8.49	120	0.7
WTP 3 Raw water	ND	ND	ND	ND	1	1	7.65	102	0.5

Note: **ND** – not detected by method **Red** - Results exceeded the PNSDW limit

2018 PHYSICAL AND CHEMICAL RESULT

Pump Stations	Arsenic	Cadmium	Lead	Nitrate	Apparent Color	Turbidity	pH	Total Dissolved Solids	Residual Chlorine
	0.010 ppm	0.003 ppm	0.01 ppm	50	5 CU	5 NTU	6.5-8.5	500/10*	0.3-1.5ppm
Palmera deepwell	ND	ND	ND		<5		6.94		
PS13	ND	ND	ND	0.47	<5			468	0.5
PS20	ND	ND	ND	1.52	<5	<0.05	6.98	139	0.59
PS22	ND	ND	ND	0.5	<5	<0.05	6.98	256	1.2
PS26	ND	ND	ND	.435	<5	1	6.63	115	1.2
PS27	ND	ND	ND	0.37	<5	<0.05	8.1	354	.33
PS28	ND	ND	ND	0.5	<5			306	0
PS29	ND	ND	ND	0.46	<5		7.01	454	0.86
PS36	ND	ND	ND	0.447	<5	<0.05	7.9	292	1.76
PS40	ND	ND	ND	0.447	<5	<0.05	6.98	120	0.6
PS45	ND	ND	ND	0.493	<5	1.2	7.46	185	0.61
PS53	ND	ND	ND	0.478	<5	<0.05	7.0	198	0.64
PS54	ND	ND	ND	0.4	<5	<0.05	7.5	258	0.86
WTP 1	ND	ND	ND	0.43	<5	<0.05	7.2	135	0.7
WTP 2	ND	ND	ND	0.46	<5	<0.05	7.11	107	1.01

Note: **ND** – not detected by method

Red - Results exceeded the PNSDW limit

2.14 Water Quality Target

Water quality target of SJDMCWD-PWIC is based on the Philippine National Standards for Drinking Water 2017.

A. Treatment Area:

a. Chlorination:

LOCATION	TARGET DOSAGE	RESIDUAL CHLORINE (END POINT)
Pump Stations (Sodium Hypochlorite)	0.6±0.2 ppm	0.4±0.2ppm
Pump Stations (Chlorine Dioxide)	0.3±0.1 ppm	0.3±0.1ppm

b. Pump Station:

PARAMETERS	SJDMCWD-PWIC WATER QUALITY TARGET	PNSDW 2017 PERMISSIBLE LEVEL
a. PHYSICAL/ CHEMICAL		
Turbidity	5 NTU	5 NTU
Apparent Color	10 ACU	10 ACU
pH	6.5-8.5	6.5-8.5
Total Dissolved Solids	600 mg/L	600 mg/L
Arsenic	0.01 mg/L	0.01 mg/L
Nitrate	50 mg/L	50 mg/L
Cadmium	0.003 mg/L	0.003 mg/L
Lead	0.01 mg/L	0.01 mg/L
Iron	1.0 mg/L	1.0 mg/L
Manganese	0.4 mg/L	0.4 mg/L
Residual Chlorine	0.3-1.5ppm	0.3-1.5ppm
b. MICROBIOLOGICAL		
Total Coliform (MFT)	<1.0 MPN/ 100mL	<1.0 MPN/ 100mL
Fecal Coliform (MFT)	<1.0 MPN/ 100mL	<1.0 MPN/ 100mL
Total Coliform (MTFT)	<1.0 MPN/ 100mL	<1.0 MPN/ 100mL
Fecal Coliform (EST)	<1.0 MPN/ 100mL	<1.0 MPN/ 100mL
Heterotrophic Plate Count	<500 CFU/mL	<500 CFU/mL

III. HAZARD IDENTIFICATION AND RISK ASSESSMENT

The WSP team took into consideration unusual events that may affect the quality of water being delivered by San Jose Water. The team identified risks that may occur in each step of the validated process flow. The hazard and hazardous event identification was conducted through existing records, historical events, local knowledge, and on-site visits that can affect the safety of a water supply and establish what requires controlling the hazards in order to provide safe drinking-water. The WSP team considered all potential biological, physical, and chemical hazards that could be associated with the water supply.

The hazards were ranked to establish priorities. The WSP team used a semi-quantitative risk assessment, to calculate a priority score for each identified hazard. The objective of the prioritization matrix is to rank hazardous events to provide a focus on the most significant hazards. The likelihood and severity were derived from the team's technical knowledge and expertise, historical data and relevant guidelines.The table on the next page describes these quantitative risk matrix used to rate the likelihood or frequency and severity or consequence of the hazards when it occurred for calculation of the risk score.The WSP team determined a cut - off point, which is risk score of 5, above which all hazards will be retained for further consideration. There is little value in expending a great deal of effort considering very small risks.

Please use the table below as a guide for the Risk Matrix Assessment.

Please use Table A and Table B to establish the *Priority Level* of each hazard. Then use Table C to establish the Severity Rating

Table A "Priority Level"

Risk Matrix	Insignificant No detectable impact Rating: 1	Minor Minor objection - will not lead to use of alternative water Rating: 2	Moderate Major objection - will lead to use of alternative water Rating: 3	Major Morbidity expected Rating: 4	Catastrophic Mortality expected Rating: 5
Almost Certain Occurred in the past and could happen again **Rating: 5**	5	10	15	20	25
Very likely Occurred in the past and could potentially happen **Rating: 4**	4	8	12	16	20
Foreseeable Could happen under certain circumstance **Rating: 3**	3	6	9	12	15
Unlikely Cannot be ruled out completely **Rating: 2**	2	4	6	8	10
Most unlikely Highly improbable to happen **Rating: 1**	1	2	3	4	5

Priority Level	Action type
Very High	Immediate action needed
High	Part of short-term plan
Moderate	Part of medium-term plan
Low	For periodic review

Table B "Priority Risk Score"

Risk Factor Matrix:		Severity or Consequence				
		Insignificant No detectable impact **Rating: 1**	**Minor** Minor objection will not lead to use of alternative water **Rating: 2**	**Moderate** Major objection will lead to use of alternative water **Rating: 3**	**Major** Morbidity expected **Rating: 4**	**Catastrophic** Mortality expected **Rating: 5**
Likelihood or frequency	**Almost Certain** Once a day **Rating: 5**	5	10	15	20	25
	Likely Once a week **Rating: 4**	4	8	12	16	20
	Moderate Once a month **Rating: 3**	3	6	9	12	15
	Unlikely Once a year **Rating: 2**	2	4	6	8	10
	Rare Once every 5 years **Rating: 1**	1	2	3	4	5

Priority Level	Priority Type	Risk Score	Action Levels
1	High	15 - 25	The risk requires immediate control measures
2	Moderate	6 - 14	The risk requires determination of additional control measure
3	Low	1 - 5	Risk should be documented and requires revisiting in the future

Table C "Severity Rating"

Severity Rating	Descriptor	Description
1	Insignificant	No detectable impact
2	Minor	Minor objection - will not lead to use of alternative water
3	Moderate	Major objection - will lead to use of alternative water
4	Major	Morbidity expected
5	Catastrophic	Mortality expected

A. WATERTREATMENTPLANTNO.1,2 and 3

Table 6 – Hazard Identification and Risk Assessment for Water Treatment Plants No. 1, 2 and 3

ProcessStep	HazardousEvent	Hazard	Likelihood	Severity	Score	Rating
Pre-Chlorination	Failure of disinfection due to breakdown of chlorination units for chlorine gas	Microbial	5	5	25	Very High
	Failure of disinfection due to lack of chlorine gas supply	Microbial	5	5	25	Very High
Screening (WTP2)	Lack of screening process in WTP2 due to breakdown of equipment	Physical	5	3	15	High
Flash Mixing (WTP1)	Low output of coagulant due to clogged feed lines resulting to high turbidity of clarified water	Physical	5	3	15	High
	High turbidity of clarified water due to break-down of dosing pump	Physical	5	3	15	High
	No floc formation resulting to high turbidity of clarified water due to lack of coagulant supply	Physical	5	3	15	High

	Poor floc formation due to non-compliance to specification of supplied coagulant	Physical	4	3	12	High
	Contamination of open water surface (flashmixer, pulsator, filtration) due to ash fall, sabotage, bird droppings, etc.	Physical	4	3	12	High
		Chemical	4	5	20	Very High
		Microbial	4	5	20	Very High
Lamella Clarifier (WTP3)	Low output of coagulant due to clogged feedlines resulting to high turbidity of clarified water	Physical	5	3	15	High
	High turbidity of clarified water due to break-down of dosing pump	Physical	5	3	15	High
	No floc formation resulting to high turbidity of clarified water due to lack of coagulant supply	Physical	5	3	15	High

	Contamination of open water surface due to ash fall, sabotage, bird droppings, etc.	Physical	4	3	12	High
Raw Water Tank (WTP2)	Low output of coagulant due to clogged feedlines resulting to high turbidity of raw water tank sample	Physical	5	3	15	High
	High turbidity of raw water tank sample due to break-down of dosing pump	Physical	5	3	15	High
	No floc formation resulting to high turbidity of raw water tank sample due to lack of coagulant supply	Physical	5	3	15	High
	Poor floc formation due to non-compliance to specification of supplied coagulant	Physical	4	3	12	High
	Contamination of open water surface (raw water inlet, flocculation tank, raw water tank) due to ash fall, sabotage, bird droppings, etc.	Physical	4	3	12	High
		Chemical	4	5	20	Very High
		Microbial	4	5	20	Very High
Pulsation (WTP1)	High turbidity of clarified water due to break-down of vacuum pumps and	Physical	4	3	12	High

	compressor					
Filtration	High turbidity of filtered water due to fine flocs passing through the filter	Physical	5	3	15	High
Microfiltration (WTP2 – AmiadFilters)	High turbidity of filtered water due to fine flocs passing through the filter	Physical	5	3	15	High
Post-Chlorination	Failure of disinfection due to breakdown of chlorine dosing pumps for liquid calcium hypochlorite	Microbial	5	5	25	Very High
	Failure of disinfection due to insufficient liquid calcium hypochlorite stock	Microbial	5	5	25	Very High
	Insufficient disinfection due to low chlorine concentration of supplied liquid calcium hypochlorite.	Microbial	5	5	25	Very High

Reservoir	Intrusion of contaminants (animal entry) due to unsecured vent cover of reservoir openings	Microbial	5	5	25	Very High
	Breakdown of booster pumps resulting to low pressure to no water at service area.	Physical	5	3	15	High
		Microbial	5	5	25	Very High

B. GROUNDWATER

Table 7 – Hazard Identification and Risk Assessment for Ground water

ProcessStep	HazardousEvent	Hazard	Likelihood	Severity	Score	Risk Rating
Well/Catchment	Seepage of leachate from septic tanks of nearby houses near well sources developed by San Jose Water	Physical	5	2	10	High
		Microbial	5	5	25	Very High
	Seepage of leachate from septic tanks of nearby houses near well sources turned over by developer	Physical	5	2	10	High
		Microbial	5	5	25	Very High
Disinfection	Failure of disinfection due to equipment Breakdown	Microbial	5	5	25	Very High
	Shortage of Chlorine at deepwell pumping station	Microbial	5	5	25	Very High
Reservoir	Intrusion of contaminants due to exposed /unsecured vent covers of reservoir openings animal & birdentry)	Microbial	5	5	25	Very High

C. Distribution

Table 8 – Hazard Identification and Risk Assessment for Distribution Lines

Process Step	Hazardous Event	Hazard	Likelihood	Severity	Score	Risk Rating
Storage	Intrusion of contaminants into Storage tanks due to sabotage	Chemical	5	4	20	Very High
	Yellowish water due to rusted inner surface of dilapidated storage tank	Physical	5	3	15	Very High
	Turbid water due to Pressure Fluctuations and intermittent Supply	Physical	5	2	10	High
Distribution	Turbidity of supply after repair due to pipeline breakage	Physical	5	2	10	High

	Intrusion of contaminants due to sub-standard materials and improper installation of service connection	Physical	5	3	15	Very High
	Intrusion of contaminants in supply due to illegal connections	Physical	5	3	15	Very High
	Yellowish Water due to deterioration of Steel pipes	Physical	5	3	15	Very High
Consumer Premises	Intrusion of contaminants due to substandard materials, improper installation & unsafe practice at Consumer premises	Microbial	5	5	25	Very High

IV. DETERMINE AND VALIDATE CONTROL MEASURES, REASSESS AND PRIORITIZE THE RISKS

After identifying potential risks and hazards that may affect the quality of water being delivered to concessionaires, the WSP team established control measures to address the identified possible risks. Each control measure was validated to verify its efficacy based on records, data gathered and on-site assessment.

Upon validation of control measures, the risk rating for each stage of the treatment process, storage, distribution system, down to the tap of every home were reduced. The reduction in the risk rating achieved by each control is an indication of its effectiveness. The risks were prioritized in terms of their likely impact to the capacity of the system to deliver safe water. High priority risks (risk rating from medium to very high) may require system modifications or upgrades while lower priority risks (risk rating of low) can often be minimized as part of routine good practice activities.

A. WATER TREATMENT PLANT NO.1, 2 and 3

Table 9 – Identification of Hazards, Hazardous Events and Risk Assessment/Determination and Validation of Control Measures and Risk Reassessment for WTPs No.1, 2 and 3

Process Step	Hazardous event (Source of hazard)	Hazard	Raw Risk			Existing Control Measure	Validation	Res. Risk			Proposed Control Measure
			Likelihoo	Severity	Score			Likelihoo	Score	Rating	
Pre-Chlorination	Failure of disinfection due to breakdown of chlorination units for chlorine gas/liquid calcium hypochlorite	M	5	5	25	Regular preventive maintenance of chlorination units for chlorine gas (WTP 1 and 2)/liquid calcium hypochlorite (WTP3)	No incident of break-down of chlorination units for the past month.	3	15	H	Purchase of complete set spare chlorinators, regulators, ejectors, and booster pumps.

	Failure of disinfection due to lack of chlorine gas/ liquid calcium hypochlorite supply	M	5	5	25	Spare stock of chlorine gas good for 2 months consumption is maintained. Alternative use of liquid calcium hypochlorite for pre-chlorination is available. Maintain two suppliers. For WTP3: Stock of liquid calcium hypochlorite, good for 2 months consumption is maintained	Chlorine gas inventory is available for at least two months level. Occurrence of lack of chlorine gas supply happened in the past two months in which liquid calcium hypochlorite is used in pre-chlorination.	1	5	L	Maintaining of stock level for at two months
Screening (WTP2)	Lack of screening process in WTP2 due to breakdown of equipment	P	5	3	15	Regular preventive maintenance of screening equipment	No incident of screening failure for the last two years	1	3	L	

Flash Mixing (WTP1)	Low output of coagulant due to clogged feedlines resulting to high turbidity of clarified water	P	5	3	15	Regular flushing of feed lines and on-site coagulant output verification	No data recorded showing 0% reduction in raw water turbidity in the clarified water	1	3	L	
	High turbidity of clarified water due to break-down of dosing pump	P	5	3	15	Regular preventive maintenance of dosing pump units and available standby dosing pumps	No incident of break-down of dosing pump units for the past year.	1	3	L	

	No floc formation resulting to high turbidity of clarified water due to lack of coagulant supply	P	5	3	15	The current storage tank can accommodate stock/inventory good for 2 months consumption. Level indicator is installed to measure stock level.	Chemical coagulant inventory is maintained to have available stock for at least two months as indicated by the level indicator. Two suppliers are available to supply coagulant.	1	3	L	
	Poor floc formation due to non-compliance to specification of supplied coagulant	P	4	3	12	Certificate of analysis from chemical supplier indicating % Alumina of delivered coagulant	Two incidents of poor floc formation in the clarified water due to low quality of Coagulant happened in thepast 2 years.	3	9	M	Conduct Alumina Testing of coagulant to ensure conformance to % Alumina of delivered sample
	Contaminationof open water surface (flashmixer, pulsator, filtration) due to ash fall, sabotage, bird droppings, etc.	P	4	3	12	Frequent monitoring of security personnel to prevent unauthorized access or dumping/throwing.Operators with visual monitoring/CCTV of open water surface.	No report of sabotage incident within the open water surface. Sabotage event can still happen since there is no installed roofing in the area.	4	12	H	Roofing of open water surface in WTP Process.
		C	4	5	20			4	20	VH	
		M	4	5	20			4	20	VH	

Lamella Clarifier (WTP3)	Low output of coagulant due to clogged feedlines resulting to high turbidity of clarified water	P	5	3	15	Regular flushing of feed lines and on-site coagulant output verification	No data recorded showing 0% reduction in raw water turbidity in the clarified water	1	3	L	
	High turbidity of clarified water due to break-down of dosing pump	P	5	3	15	Regular preventive Maintenance of dosing pump units and available standby dosing pumps	No incident of break-downof dosing pump units for the past year.	1	3	L	
	No floc formation resulting to high turbidity of clarified water due to lack of coagulant supply	P	5	3	15	The current storage tank can accommodate stock/inventory good for 2 months consumption. Level indicator is installed to measure stock level.	Chemical coagulan tinventory is maintained to have available stock for at least two months as indicated by the level indicator. Two suppliers are available to supply coagulant.	1	3	L	
	Contamination of open water surface (flash mixer, pulsator, filtration, dueto ash fall,sabotage, bird droppings,etc.	P	4	3	12	Frequent monitoring of security personnel to prevent unauthorized access or dumping/throwing.Operators with visual monitoring/CCTV of open watersurface.	No report of sabotage incident within the open water surface. Sabotage event can still happen since there is no installed roofing in the area.	4	12	H	Roofing of open water surface in WTP Process.
	Low output of coagulant due to					Regular flushing offeed lines and					

	clogged feedlines resulting to high turbidity of raw water Tank sample	P	5	3	15	on-site coagulant pump output verification	No data recorded showing 0% reduction in raw water turbidity in the clarified water	1	3	L	
Raw Water Tank (WTP2)	High turbidity of raw water tank sample due to break-down of Dosing pump	P	5	3	15	Regular preventive maintenance of dosing pump units and available standby dosing pumps	No incident of break-down of dosing pump units for the past year.	1	3	L	
	No floc formation resulting to high turbidity of raw water tank sample due to lack of coagulant supply	P	5	3	15	The current storage tank can accommodate stock/inventory good for 2 months consumption. Level indicator is installed to measure stock level.	Chemical coagulant inventory is maintained to have available stock for at least two months as indicated by the level indicator. Two supplier is available to supply coagulant.	1	3	L	
	Poor floc formation dueto non-compliance to specification of supplied coagulant	P	4	3	12	Certificate of analysis from chemical supplier indicating % Alumina of delivered coagulant	One incident of poor floc formation in the raw water tank due to low quality of coagulant happened in the past 2 years.	3	9	M	Conduct Alumina Testing of coagulant to ensure conformanceto % Alumina of delivered sample
	Contamination of open water surface (raw water inlet, floc culation tank, raw	P	4	3	12	Frequent monitoring of security personnel to prevent unauthorized access or dumping/throwing. Operators with	No report of sabotage incident within the	4	12	H	Roofing of open water surface in WTP Process.

	water tank) due to ash fall, sabotage, bird droppings, etc.					visual monitoring/CCTV of open water surface.	open water surface. Sabotage event can still happen since there is no installed roofing in the area.				
Pulsation (WTP1)	High turbidity of clarified water due to break-down of vacuum pumps and compressor	P	4	3	12	Regular preventive maintenance of vacuum pump & compressor	No occurrence of compressor break-down for the past 2 years.	1	3	L	
Filtration	High turbidity of filtered water due to fine flocs passing through the filter	P	5	3	15	Replenishment of filter rmedia	High turbidity of filtered water in filtration units during period of more than 10NTU Raw Water Turbidity	4	12	H	Complete replacement of filter rmedia used infiltration
Microfiltration (WTP2-AmiadFilters)	High turbidity of filtered water due to fine flocs passing through the filter	P	5	3	15	Regular preventive maintenance of microfiber filter cartridge	High turbidity of filtered water in microfiltration units during period of more than 10 NTU Raw Water Turbidity	4	12	H	Complete replacement of microfiber filter cartridge used in microfiltration units
Post-Chlorination	Failure of disinfection due to breakdown of chlorine dosing pumps for liquid	M	5	5	25	Regular preventive maintenance of chlorination units for liquid calcium hypochlorite. Maintain chlorine residual	No incident of break-down of chlorination units for the past month.	3	15	H	Purchase of complete set of dosing pump, hose and fittings .

	calcium hypochlorite										
	Failure of disinfection due to insufficient liquid calcium hypochlorite stock	M	5	5	25	Stock of liquid calcium hypochlorite for 2 weeks consumption is available in use for post-chlorination. In case of out-of-stock chlorine gas is use for post-chlorination.	Current storage for liquid calcium hypochlorite supply only lasts for two weeks consumption. Chlorine gas is used when the liquid calcium hypochlorite supply is empty.	2	10	H	Increase storage tank capacity that can accommodate liquid calcium hypochlorite consumption good for a month consumption. Maintain at least two supplier of liquid calcium hypochlorite.
	Insufficient disinfection due to low chlorine concentration of supplied liquid calcium hypochlorite.	M	5	5	25	Adjustment of chlorine dosing pump to correct setting to facilitate effective disinfection.	Once a month adjustment of chlorine dosing due to low chlorine concentration of liquid calcium hypochlorite	1	5	L	Conduct Hypochlorite Testing to measure % Chlorine to check conformance to specification.
Reservoir	Intrusion of contaminants (animal entry) due to unsecured vent cover of reservoir openings	M	5	5	25	Fencing and security personnel deployment. Padlocks and durable covers are installed.	Small animals cannot pass through vent covers; hatches are securely locked with no signs of forced entry	1	5	L	
	Break down of booster					Implement predictive, preventive,	Occurrence of				Purchase of spare units and parts, set-

	pumps resulting to low pressure to no water at service area.	P	5	3	15	and corrective maintenance program	corrective maintenance has been conducted 4 months ago and was immediately repaired with no interruption required.	3	9	M	up standby units.
		M	5	5	25			3	15	H	

B. GROUNDWATER

Table 10 – Identification of Hazards, Hazardous Events and Risk Assessment/Determination for Ground water

Process Step	Hazardous Events /Cause of Contamination	Raw Risk				ControlMeasure	Validation of Control Measure	Residual Risk			Proposed Control Measure
		Hazards	Likelihood	Severity	Score			Likelihood	Score	Rating	
	Seepage of leachate from septic tanks of nearby houses near well sources developed by San Jose Water	P	5	2	10	Wells have blank casings down to 40mbgl and sanitary grout down to 15mbgl	Presence of seepage from septic tanks would normally produce odor on the water; No odor reported over the last 5years	1	2	L	

Well /Catchment		M	5	5	25	Wells have blank casings down to 40mbgl and sanitary grout down to 15mbgl	Water analysis for the past 5 years from 11 deepwell sources does not indicate any sign of seepage of leachate from septic tanks	1	5	L	

	Seepage of leachate from septic tanks of nearby houses near well sources turned over by developer	P	5	2	10	In the absence of standard depth of blank casing and cement grout, natural ground formation serves as barrier against possible seepage of leachate	Presence of seepage from septic tanks would normally produce odor on the water; No odor reported over the last 5 years	4	8	M	
		M	5	5	25		Water analysis for the past 5 years from 11 deepwell sources does not indicate any sign of seepage of leachate from septic tanks	4	20	V H	
Disinfection	Failure of disinfection due to equipment breakdown	M	5	5	25	All disinfection facilities are subjected to regular preventive maintenance and calibration every month aside from the regular visual inspection by operators on duty	Two occurrences of equipment break down for the past year for each deepwell stations	2	10	H	Installation of standby disinfection units ready to use in case of breakdown

	Shortage of Chlorine at deepwell pumping station	M	5	5	25	Regular delivery of chlorine supply to various deep well pumping stations	No incident of chlorine shortage is reported for the past year	2	10	H	Increase storage capacity of tanks in active deep well stations
Reservoir	Intrusion of contaminants due to exposed /unsecured vent covers of reservoir openings (animal & bird entry)	M	5	5	25	Installation of vent cover screens and padlocks for hatches	Small animals cannot pass through vent covers; hatches are securely locked with no signs of forced entry	1	5	L	Monitoring of screens and padlocks for hatches for signs of wearing.

C. DISTRIBUTION

Table 11 – Identification of Hazards, Hazardous Events and Risk Assessment/Determination for Distribution Lines

Process Step	Hazardous Events /Cause of Contamination	Hazards	Likelihood	Severity	Score	Control Measure	Validation of Control Measure	Likelihood	Score	Rating	Proposed Control Measures
Storage	Intrusion of contaminants into Storage tanks due to sabotage	C	5	4	20	Perimeter fencing of storage facilities;	24 storage facilities have barbed wire perimeter fences, 19 have cyclone wire fences while 10 facilities have CHB fence. There are 11 storage facilities with no perimeter fence at all	3	12	H	Fencing of storage facilities with no fence and improvement of existing perimeter fences by converting barbed and cyclone wire fencing into CHB fence

	Yellowish water due to rusted inner surface of dilapidated storage tank	P	5	3	15	Repair, Painting & Disinfection of storage tank	No reported discoloration of water caused by rusted storage tanks for the past 5 years	1	3	L	Rehabilitation of reservoirs including the repainting.
	Turbid water due to Pressure Fluctuations and intermittent Supply	P	5	2	10	Flushing if there is a need and controlling water pressure	Instances and reports of turbid water supply are minimized in the last 3 years	5	10	H	Develop additional source of water supply & storage facilities
	Turbidity of supply after repair due to pipeline breakage	P	5	2	10	Strict implementation of SOPs in isolation and leak repair.	Instances and reports of turbid water supply after repair are minimized in the last 2 years	4	8	M	Installation of additional blow-offs/hydrants for flushing purposes & installation of pressure reducing valves for pressure management
	Intrusion of contaminants due to sub-standard materials and improper installation of service connection	P	5	3	15	Prior to approval of service connection installation, it undergoes strict inspection to ensure compliance to Water District Standards	There are still Service Request (SR) /Maintenance Order (MO) regarding substandard service connection materials	3	9	M	Subject service connection materials to undergo strict quality control

	Intrusion of contaminants in supply due to illegal connections	P	5	3	15	Regular leak detection and Saturation Drive	Leak detection activities are regularly conducted to mitigate the adverse effect of illegal connections via back flow to the system upon low pressure; Zero incident of supply turbidity due to back flow caused by Illegal connections	1	5	L	Reward system for illegal connection reportee, this will be treated highly confidential.
	Yellowish Water due to deterioration of Steel pipes	P	5	3	15	Rehabilitation of old and deteriorated pipes	Minimal occurrence of iron precipitates in water supply. No reported discoloration of water caused by rusted steel pipes for the past 5 years	3	9	M	Continuous Rehabilitation of deteriorated pipelines
Consumer Premises	Intrusion of contaminants due to substandard materials, improper installation & unsafe practice at consumer premises	M	5	5	25	Information and Education campaign on standard in-house connection installation and safe water storage and handling practice	There are many Service Requests (SR) /Maintenance Orders (MO) being received due to substandard materials, improper installation & unsafe practice at consumer premises	3	15	H	Intensify Information and Education campaign on standard in-house connection installation and safe water storage and handling practice

V. IMPROVEMENT/UPGRADE PLAN

The WSP team crafted an improvement or upgrade plan for each of the identified significant risks with no known applicable controls recognized in the reassessment of risks. These improvement measures are also suitable for other less significant risks specified.

Each improvement/upgrade plan indicated is delegated to a particular officer, group or section in San Jose Water/PW-SJDMC to implement the plan within the specified target date. These improvement/upgrade plans can be short, medium or long-term programs and must be monitored to ensure that improvements have been made are effective.

San Jose Water / PW-SJDMC will allocate budget for these improvement plans.

A. WATER TREATMENT PLANT NO.1, 2, and No. 3

Table 12 - Improvement and Upgrade Plan for WTP No. 1, 2 and No.3

Action	Arising from	Identified specific improvement plan	Accountabilities	Cost/ Source of Funding	Due	Status
Implement measures to control risks arising from breakdown of chlorination units for chlorine gas	Risk assessment process has indicated a high possibility of microbial risk due to frequent malfunction of chlorination units for Chlorine gas	Purchase of complete set spare chlorinators, regulators, ejectors, and booster pumps.	Dept Manager (WTPDept)	Php 460,000.00 / Capital Expenditure Budget	Third Quarter of 2023	For purchase Requisition
Implement measures to control risks arising from failure of disinfection due to insufficient liquid calcium hypochlorite stock	Risk assessment process has indicated a high possibility of microbial risk due to insufficient stock of liquid calcium hypochlorite for post chlorination	Increase storage tank capacity that can accommodate liquid calcium hypochlorite consumption good for a month consumption. Maintain at least two suppliers of liquid calcium hypochlorite.	Dept Manager (WTPDept)	Php 100,000.00 / Capital Expenditure Budget	Last Quarter 2023	For purchase Requisition

Implement measures to control risks arising from poor floc formation due to non-compliance to specification of supplied coagulant	Risk assessment process has indicated a high possibility of turbidity due to low alumina content of supplied coagulant	Conduct of Alumina Testing of coagulant to ensure conformance to % Alumina of delivered sample	Senior Engineer A WQMS)		Third Quarter Of 2023	For preparation of SOP and chemicals needed to conduct test
Implement measures to control risks arising from sabotage and introduction of unwanted particles coming from air/environment.	The risk assessment process has indicated a high possibility of sabotage due to lack of complete protective cover for open water bearing structures. The nearby surrounding has vegetation that can conceal potential saboteur.	Install roofing for open water bearing structures.	Dept Manager (WTP Dept)	Php 3,000,000.00 / Capital Expenditure Budget	Last Quarter of 2026	Planning stage
Implement measures to control risks arising from sabotage and introduction of unwanted particles coming from air/environment.	The risk assessment process has indicated a high possibility of sabotage due to lack of complete protective cover for open water bearing structures. The nearby surrounding has vegetation that can conceal potential saboteur.	Install roofing for open water bearing structures.	Dept Manager (WTP Dept)		Last Quarter of 2026	Planning stage

Implement measures to control risks arising from poor floc formation due to non-compliance to specification of Supplied coagulant	Risk assessment process has indicated a high possibility of turbidity due to low alumina content of supplied coagulant	Conduct of Alumina Testing of coagulant to ensure conformance to % Alumina of delivered sample	Senior Engineer A WQMS)		Third Quarter Of 2023	For preparation of SOP and chemicals needed to conduct test
Implement measures to control risks arising from high turbidity of filtered water due to fine flocs passing through the filtration units	Risk assessment process has indicated a high possibility of turbidity due to frequent back washing of filters caused by fine flocs passing through the filter	Complete replacement of filter media used infiltration	Dept Manager (WTPDept)	Php 10,000,000.00 / Capital Expenditure Budget	Last Quarter of 2025	Budget Stage
Implement measures to control risks arising from breakdown of chlorine dosing pumps for liquid calcium hypochlorite	Risk assessment process has indicated a high possibility of microbial risk due to frequent malfunction of chlorination units for Liquid calcium	Purchase of complete set of dosing pump, hose and fittings.	Dept Manager (WTP Dept)	Php 230,000.00 / Capital Expenditure Budget	Third Quarter of 2023	For Purchase Requisition

Implement measures to control risks arising from breakdown of old booster pumps/units.	The risk assessment process has indicated a high possibility of turbidity due to water turbulence during filling of empty water lines. High possibility of microbial intrusion from uncorrected leaks on the water system.	Purchase of spare units and parts, set-up stand by units.	Dept Manager (WTPDept)	Php 600,000.00 / Capital Expenditure Budget	1st Quarter of 2024	Budget Stage

B. GROUNDWATER

Table13 -Improvement and Upgrade Plan for Ground Water Sources

Action	Arising from	Identified specific improvement plan	Accountability/ies	Cost/ Source of Funding	Due	Status
All disinfection facilities are subjected to regular preventive maintenance and calibration every month aside from the regular visual inspection by operators on duty	Risk assessment indicates that equipment breakdown can lead to failure of disinfection	Procurement of new chlorinator that will serve as stand by unit	Dept Manager (BWS & PSDept)	Php 300,000.00 / Capital Expenditure Budget	Last quarter of 2023	For Purchase Requisition
Regular delivery of chlorine supply to various deep well pumping stations	Possibility of microbial risk due to shortage of chlorine at deepwell pumping station	Increase capacity of chlorine storage tanks inactive deepwell stations	Dept Manager (BWS & PSDept)	Php 50,000.00 / Capital Expenditure Budget	Third Quarter of 2023	Preparation of Program of Works

C. DISTRIBUTION

Table14- Improvement and Upgrade Plan for Distribution Lines

Action	Arising from	Identified specific improvement plan	Accountability/ies	Cost/ Source of Funding	Due	Status
Perimeter fencing of storage facilities;	Risk assessment indicates the possibilityof compromise of our reservoir and pumping stations (Sabotage)	Fencing of 11 storage facilities with no fences and improvement of existing perimeter fences by converting 24 barbed wire fences into CHB fences	Dept Manager (BWS & PS Dept)	Php 5,000,000.00 / Capital Expenditure Budget	Partial Implementation for the year 2023 -2025	Budget Stage
Develop additional source of water supply & storage facilities	Risk assessment indicates the possibility of turbidity of water supply due to Pressure Fluctuations and intermittent Supply	Construction of CWSSP – Phase III (WTP3) Project	Manager, Engineering Department	Php 1,000,000.00 / Capital Expenditure Budget	Last Quarter of 2018	Constructed and operational Dec 2018

Regular Leak Detection and Field Apprehension	Risk assessment indicates the Intrusion of contaminants in supply due to illegal connections	Formation of DMA's at our Non Area System to identify areas with high NRW	Engineer A (NRW)		Daily	Daily activity
Installation of pressure reducing valves for pressure management	Turbidity of supply after repair due to pipeline breakage	Installation of Pressure Reducing Valve at Bgy. San Roque	Dept Manager (BWS&PS)	Php 1,000,000.00 / Capital Expenditure Budget	Last Quarter of 2026	Partial completion

VI. MONITORING OF THE CONTROL MEASURES (OPERATIONAL MONITORING)

To prove that the controls continue to work, the WSP team performs operational monitoring which includes defining and validating the monitoring of the control measures and developing procedures to verify the efficacy of the control measures.

All control measures identified as “critical” were assigned as “critical control points” and were monitored against “critical limits or operational limit” criteria. This critical/operational limit is a criterion that will indicate whether the control measure is effective and is functioning as it was designed to be.

The WSP team created a monitoring plan for the whole water supply system indicating an acceptable critical/operational limit for each control, designated monitoring locations, and established a schedule for frequency of monitoring and assigned responsible party to conduct the monitoring.

Corrective actions are established in the event that monitoring reveals a parameter to be outside of the acceptable “limits”. The monitoring of the control measures or operational monitoring is documented from raw water inlet to the distribution system down to consumer premises.

A. WATERTREATMENTPLANTNO.1, 2 and 3

Table 15 – Monitoring of the Control Measures for WTP No.1, 2 and No.3

Process Step/ Control Measure	Criticallimit	What	Where	When	How	Who	Corrective action
Regular preventive maintenance of chlorination units for chlorine gas	Provision of at least 1 set SpareUnit	Chlorinator	Stock Room	Monthly	Inventory	Chemist/ Technician	Request for additional Chlorinator to serve as spare unit
Spare stock of chlorine gas good for 2 months consumption is maintained	3 cylinders of 1 Ton ChlorineGas	Chlorine Cylinder	Chlorine Storage Room	Weekly	Visual Inspection	Chemist/ Technician	Request for delivery of Chlorine
Spare stock of liquid calcium hypo for 2 months consumption is maintained for WTP3	1.5 ton of liquid calcium hypo	liquid calcium hypochloride	Chlorine Storage Area	Weekly	Visual Inspection	Chemist/ Technician	Request for delivery of liquid calcium hypo

Maintain two suppliers	At least 1 supplier failed to deliver/50% of requirement for 3 months (Purchase Order)	Supplier	Procurement	Monthly	Separate supplier for each WTP	Head, Property Section	Look for other suppliers
Regular preventive maintenance of dosing pump units and available standby dosing pumps	Provision of at least 1 set Spare Unit	Dosing Pumps	Stock Room	Monthly	Inventory	Engineer, WTP Dept.	Request for additional dosing pumps to serve as spare unit
Regular flushing of feedlines and on-site coagulant pump output verification	Deviation of atleast 20 % Pac pump output	PAC Feed rate	PAC by-pass Line	Every shift duty(8hrs)	Conduct Volumetric Testing	Chemist	Activate standby unit and conduct corrective actions (e.g .flushing, repair of units,etc)
Current storage tank can accommodate stock/inventory good for 2months consumption	40MT min inventory of PAC during rainy season, 20MT min inventory during dry season	PAC Inventory	StorageTanks	Every shift duty	Chemical Inventory	Chemist	Notify supervisor if PAC is below min. standard inventory level
Adjustment of chlorine dosing pump to correct setting to facilitate	Residual chlorine leaving the plant must be 0.7 mg/L min. to 1.0 mg/L max.	Chlorine residual	At entry point to distribution system	On-line	Chlorinea nalyzer	Chemist	Activate chlorine non-compliance exceedance protocol

effective disinfection							

B. GROUNDWATER

Table 16- Monitoring of the Control Measures for Ground WaterSources

Control Measure	Operational Range & Critical Limit	What to Monitor	Where to Monitor	When to Monitor	How to Monitor	Who will Monitor	Corrective Action
All disinfection facilities are subjected to regular preventive maintenance and calibration every month aside from the regular visual inspection by operators on duty	At least 1 Spare Unit	Chlorinator	Stockroom	Monthly	Inventory	Engineer, Prod. Dept.	Request for additional Chlorinator to serve as spare unit

Regular delivery of chlorine supply to various deepwell pumping stations	At least 1 chlorine totebin full	Level of ChlorineTotebin	PS#28	Daily	Visual Inspection	Operator on Duty	Request for delivery of Chlorine
Installation of vent cover screens and padlocks for hatches	Signs of screen deterioration and damaged / Missing padlock	Condition of screen and padlock	All Reservoir Stations	Monthly	Monitoring by Visual Inspection	Engineer Prod. Dept.	Repair or Replacement of defective screen and padlocks

C. DISTRIBUTION

Table 17- Monitoring of the Control Measures for Distribution Lines

ControlMeasure	CriticalLimit	What	Where	When	How	Who	CorrectiveAction
Perimeter fencing of storage facilities;	Signs of deformation on barbed wirefence; Missing padlock songates ; Reported incidents of unauthorized entry from concerned citizens	Condition of perimeter fences & padlocks	All Storage tank facilities	Monthly / As needed	Monitoring by Visual Inspection	Engineer Production Dept.	Fencing of storage facilities with no fence and improvement of existing perimeter fences by converting barbed wire fencing in to CHB fence
Repair, Painting & Disinfection of storage tank	Complaints regarding water quality	Water Supply	Faucet within facility /vicinity	Daily	Collection of Water Sample	Operator on Duty	Isolation of storage tank until rehabilitation is completed

Strict implementation of SOPs in isolation and leak repair.	Complaints Regarding water quality	Water Supply	Faucet within vicinity	Daily	Collection of Water Sample	Operator on Duty	Flushing at hydrant/blow offs
Regular leak detection and Saturation Drive	Increase in Non-Revenue Water per DMA (NRW >25%)	NRW Database	DMA	Monthly	NRW Analysis	Engineer, NRW Section	Continuous Formation and monitoring of DMA and intensify leak detection activities
Rehabilitation of old and deteriorated pipes	Complaints regarding water quality	Water Supply	Faucet within vicinity	Daily	Collection of Water Sample	Manager, Engineering Dept.	Rehabilitation of deteriorated pipelines

VII. VERIFICATION

As a guarantee that the overall system design and operation is efficient of delivering safe and potable water to concessionaires, the WSP team performs verification which involves three activities:

1. Compliance monitoring – confirmation of compliance with water quality targets.
2. Internal and external auditing of operational activities – it can have both an assessment and a compliance checking role. The frequency of audit depends on the level of confidence required by the water utility and the regulatory body.
3. Consumer satisfaction – includes checking that consumers are satisfied with the water supplied.

Table 7.1 Water Quality Surveillance Report as of April 2023

Clients	Location	Turbidity	Residual Chlorine
V. Casuyon	B17 L38 Grand Cypress	Negative	1.19 PPM
Gumaoc Central Brgy. Hall	Gumaok Central	Negative	0.66 PPM
Greg Feliciano	Carriedo	Negative	0.97 PPM
Roel Igloria	Area E Fatima V	Negative	1.08 PPM
F. Lopez	Minuyan 2	Negative	1.13 PPM
Erlinda Rocha	B22 L12 Area H San Rafael I	Negative	0.56 PPM
Gaya Gaya Day Care	Gaya Gaya	Negative	0.52 PPM
Regasco Store	Daang Barrio	Negative	0.73 PPM
Kamazura F.	Gaya Gaya	Negative	1.14 PPM
Linawan Family	B3 L1 Ph 1 Sarmiento	Negative	0.58 PPM
F. Flores	Francisco Homes 2 Gaya Gaya	Negative	1.09 PPM
Poblacion Elementary School	Poblacion	Negative	0.63 PPM

BBC Elementary School	Area-C Brgy San Martin	Negative	1.08 PPM
Muzon Elementary School	Muzon	Negative	0.68 PPM
Lhen Store	Muzon	Negative	0.44 PPM
Tungkong Mangga Health Center	Tungkong Mangga	Negative	0.65 PPM
Bulacan State University	Kaypian	Negative	0.64 PPM
BBH Elementary School	Area H San Rafael	Negative	0.69 PPM
Sapang Palay Proper Elementary School	Sapang Palay Proper	Negative	0.72 PPM
Robin Lucas	B4 L26A Melody Plains	Negative	1.92 PPM

Philippine National Standard Drinking Water (PNSDW) 2017 limit: Residual chlorine: 0.3 – 1.5 ppm

Table 7.2 Water Microbiology Analysis Report (as of April 2023)

Concessionaire/ Location	Pour Plate Method	Multiple Tube Fermentation Technique		Remarks
	Colony Forming Unit/mL	Most Probable Number/100mL		
	Heterotrophic Plate Count (HPC)	Total Coliform	Thermotolerant Coliform/E. Coli	
Minuyan Quarry, Elementary School	6	< 1	< 1	Passed
T. Ville Subd., elementary School, Minuyan Proper	2	< 1	< 1	Passed
Area G, Brgy. Citrus, Elementary School	8	< 1	< 1	Passed
Area I, Elementary School, Lawang Pari	6	< 1	< 1	Passed
Area B, elementary School, BBB	10	< 1	< 1	Passed
Area C, High School, Brgy. San Martin IV	10	< 1	< 1	Passed
Area D, Elementary School, Brgy. Sta Cruz IV	36	< 1	< 1	Passed
Area F, Elementary School, Brgy. San Pedro	12	< 1	< 1	Passed
Area H, Elementary School, Brgy. San Rafael IV	10	< 1	< 1	Passed

Area E, High School, brgy. Fatima IV	4	< 1	< 1	Passed
Lhen Store, Concordia, Brgy. Dulong Bayan	10	< 1	< 1	Passed
Holy Angel Subdivision, Guard House, Brgy. Kaypian	6	< 1	< 1	Passed
Camella San Jose, Guard House, Brgy. Sto. Cristo	4	< 1	< 1	Passed
Northhills Subd., Guard House, Minuyan Proper	4	< 1	< 1	Passed
Green Leaf, Guard House, Brgy. Kaypian	4	< 1	< 1	Passed
Marcella Village, Brgy. Mulawin	10	< 1	< 1	Passed
North fairways, Guard House, Brgy. Muzon	150	< 1	< 1	Passed
Toyota Village, Day Care, Brgy. Tubigan	10	< 1	< 1	Passed
Regasco Store, Daang Barrio	4	< 1	< 1	Passed
Sagip Tahanan, Day Care, San Jose	8	< 1	< 1	Passed

Philippine National Standard Drinking Water (PNSDW) 2017 limits: Heterotrophic Plate Count : < 500 CFU/Ml
Total and Thermotolerant Coliforms/E. Coli : < 1.1 MPN/ 100 mL

Sampling and Analysis:

There are identified households to represent every pumping station of SJDMCWD/PWIC and One sample for every 1,350 concessionaires. This is randomly done every first week of the month. Samples are sent to DOH accredited Water Laboratory for analysis.

Table 7.3 Physical Chemical Analysis Report: Wet Chemistry from 2018-2022

Consumer's tap	Parameters Tested									Remarks
	Color									
	2018	2019 1st half	2019 2nd half	2020 1st half	2020 2nd half	2021 1st half	2021 2nd half	2022 1st half	2022 2nd half	
Area F		1	1	1	0	0	0	0	0	Passed
Francisco Homes I	<5	1	1	1	0	0	0	0	0	Passed
Moldex Guard House	<5	1	1	1	0	0	0	0	0	Passed
Poblacion		1	1	1	0	0	0	0	0	Passed
Towerville Sto Cristo		1	1	1	0	0	0	0	0	Passed

Consumer's tap	Parameters Tested									Remarks
	Turbidity									
	2018	2019 1st half	2019 2nd half	2020 1st half	2020 2nd half	2021 1st half	2021 2nd half	2022 1st half	2022 2nd half	
Area F		1	1	1	0.05	0.05	0.5	0.05	0.05	Passed
Francisco Homes I	<5	1	1	1	0.05	0.05	0.5	0.5	2.09	Passed
Moldex Guard House	<5	1	1	1	0.05	0.05	0.5	0.5	0.05	Passed
Poblacion		1	1	1	0.05	0.05	0.5	0.5	0.05	Passed
Towerville Sto Cristo		1	1	1	0.05	0.05	0.5	0.05	3.51	Passed

Consumer's tap	Parameters Tested									Remarks
	pH									
	2018	2019 1st half	2019 2nd half	2020 1st half	2020 2nd half	2021 1st half	2021 2nd half	2022 1st half	2022 2nd half	
Area F		7.67	7.16	7.13	7.78	7.50	7.5	7.20	6.59	Passed
Francisco Homes I	6.63	7.40	7.34	7.77	7.75	7.62	7.07	7.63	6.8	Passed
Moldex Guard House	6.99	7.58	6.88	7.13	7.79	7.54	6.96	7.22	7.01	Passed
Poblacion		7.66	7.25	7.13	7.65	7.77	7.4	7.52	6.82	Passed
Towerville Sto Cristo		7.89	7.20	7.46	7.64	7.44	7.03	7.39	6.67	Passed

Philippine National Standards for Drinking Water (PNSDW) 2017 limits:

pH : 6.5-8.5 pH units

Color : 10CU

Turbidity:5NTU

Table 7.4 Physical Chemical Analysis Report: Heavy Metal from 2018-2022

Consumer's tap	Parameters Tested									Remarks
	Cadmium									
	2018	2019 1st half	2019 2nd half	2020 1st half	2020 2nd half	2021 1st half	2021 2nd half	2022 1st half	2022 2nd half	
Area F		<0.003	<0.003	0.003	0.003	0.003	0.0004	0.00004	0.0005	Passed
Francisco Homes I	<0.0003	<0.003	<0.003	0.003	0.003	0.003	0.0004	0.00004	0.0005	Passed
Moldex Guard House	<0.0003	<0.003	<0.003	0.003	0.003	0.003	0.0004	0.00004	0.001	Passed
Poblacion		<0.003	<0.003	0.003	0.003	0.003	0.0004	0.00004	0.0014	Passed
Towerville Sto Cristo		<0.003	<0.003	0.003	0.003	0.003	0.0004	0.00004	0.0017	Passed

Consumer's tap	Parameters Tested									Remarks
	Lead									
	2018	2019 1st half	2019 2nd half	2020 1st half	2020 2nd half	2021 1st half	2021 2nd half	2022 1st half	2022 2nd half	
Area F		<0.002	<0.002	0.002	0.002	0.002	0.001	0.001	0.001	Passed

Francisco Homes I	<0.0003	<0.002	<0.002	0.002	0.002	0.002	0.001	0.001	0.001	Passed
Moldex Guard House	<0.0003	<0.002	<0.002	0.002	0.002	0.002	0.001	0.001	0.001	Passed
Poblacion		<0.002	<0.002	0.002	0.002	0.002	0.001	0.001	0.001	Passed
Towerville Sto Cristo		<0.002	<0.002	0.002	0.002	0.002	0.001	0.001	0.001	Passed

Philippine National Standard Drinking Water (PNSDW) 2017 limits:

Cadmium : 0.003 mg/L

Lead : 0.01 mg/L

Table 7.5 Physical Chemical Analysis Report: Chlorine Residual 2018-2022

Consumer's tap	Parameters Tested									Remarks
	Residual Chlorine									
	2018	2019 1st half	2019 2nd half	2020 1st half	2020 2nd half	2021 1st half	2021 2nd half	2022 1st half	2022 2nd half	
Area F		0.8	0.7	0.8	0.5	1.2	0.38	0.38	0.5	Passed
Francisco Homes I	1.2	0.8	0.6	0.8	0.5	0.3	0.7	0.33	0.53	Passed
Moldex Guard House	0.61	0.8	0.6	0.9	0.5	1.4	0.97	0.39	0.64	Passed
Poblacion		0.7	0.7	0.4	0.5	0.5	0.46	0.34	0.51	Passed
Towerville Sto Cristo		0.8	0.7	0.7	0.5	0.4	0.68	0.32	0.6	Passed

Philippine National Standard Drinking Water (PNSDW) 2017 limits:

Residual Chlorine : 0.3 – 1.5 mg/L

Sampling and Analysis:

The sample for physical and chemical analysis is prepared once a year. The aim of this physical and chemical analysis is to measure the 9 parameters that can react with the water and affect the human health.

7.2 Verification Monitoring Plan

In terms of verifying the procedures and processes, one needs to access and monitor the recorded documents. __WD's/PWIC's different verification procedures of water quality from catchment, treatment up to the distribution and customer satisfaction are elaborated below:

Table 7.5 Audit of Records

Activity	Location of Activity	Description of Activity	Frequency of Activity	Analyst	Recipient of Analysis *Result	Action on unusual/ failing result	3rd-Party Recipient of Results
Water Quality							
Records verification • Pressure • Water level • Volumetric flow • Chlorine residual • Maintenance request	Pumping Station	Operations audit	Daily/as needed	Production/ Water Source Division	Production Head/ Water Treatment Plant Department Head/ Technical Head/ Branch Manager	Conduct investigation and make necessary adjustments	

Microbiological	Randomly Selected Household	External Audit	Monthly	DOH Accredited Water Laboratory	Water Treatment Plant Department Head/ Technical Head/ Branch Manager	Protocol on failed results	Local Health Office /LWUA
Physical and Chemical	Water Source	External Audit	Semi-Annual	DOH Accredited Water Laboratory	Water Treatment Plant Department Head/ Technical Head/ Branch Manager	Protocol on failed results	LocalHealth Office/LWUA
Chlorine Residual	Water Source & Consumer's tap	Water Quality Monitoring	Daily	Production/ Water Treatment Plant Dept	Water Treatment Plant Department Head/ Technical Head/ Branch Manager	Adjustment on chlorine dosing	Local Health Office /LWUA

\Water Sources							
Deep well	Pumping Station	Internal Audit	Daily Monitoring	Production/ Water Source Division	Water Treatment Plant Department Head/ Technical Head/ Branch Manager	Well Repair/Well Rehabilitation	
Water Treatment Plant 1, 2 & 3	WTP 1, 2 & 3	Internal Audit	Daily Monitoring	Production/ Water Treatment Plant Dept	Water Treatment Plant Department Head/ Technical	Repair and other corrective measures	
Bulk Water Suppliers	Bulacan Bulk IP & Angat Bulk Reservoirs	Internal Audit	Daily Monitoring	Production/ Water Treatment Plant Dept	Water Treatment Plant Department Head/ Technical Head/ Branch Manager	Inform Bulk Suppliers for immediate action.	
Main line leak	WTPs, Pumping Station and Booster Stations	Internal Audit	Daily	Production/ Water Treatment Plant Dept	Water Treatment Plant Department Head/ Technical Head/ Branch	Repair or replace equipment/ standby generator set	
Treatment							
Chlorine treatment	Water Source Station	Internal Audit	Daily	Production/ Water Source Division	Water Treatment Plant Department Head/ Technical	Adjustment of Chlorinator setting	

A. WATERTREATMENTPLANT No.1, 2 AND 3

Table 18 – Verification of Control Measures for WTPNo.1, 2 and No.3

Verification Activity	Location of Activity	Type of Activity	Frequency of activity	Analyst	Recipient of Analysis Result*	Action on unusual/ failing result	3rd-Party Recipient of Results
Total & Fecal Coliform	Consumer's taps randomly selected per designed sampling plan	Sampling	Monthly	DOH accredited lab	Senior Engineer A,Dept Manager (WTP)	For resampling of positive consumer's tap as well as before & after the sample location	LWUA, City Health Office
Heterotrophi cPlate Count	Consumer's taps randomly selected per designed sampling plan	Sampling	Monthly	DOH accredited lab	Senior Engineer A,Dept Manager (WTP)	For resampling of positive consumer's tap as well as before & after the sample location	LWUA, City Health Office

Residual Chlorine	WTP Treated Water, BS, Reservoir, Consumer's tap	Sampling	Daily	In-house Laboratory	Senior Engineer A,Dept Manager (WTP)	For re-chlorination of non-complying residual in selected areas, adjustment of Chlorine dose	LWUA
Physical & Chemical Analysis (nine (9) Priority	WTP Raw Water Inlet, WTP Treated Water	Sampling	Semi-Annually	DOH accredited lab	Senior Engineer A, Dept	For resampling	LWUA
Parameters)					Manager (WTP)		
Physical & Chemical Analysis (9 Priority Parameters)	Representative Sample of Extremities in the distribution (Consumer'stap)	Sampling	Semi-Annually	DOH accredited lab	Senior Engineer A, Dept Manager (WTP)	In case of High Turbidity, Flushing of Hydrants and Blow-offs	LWUA
Physical & Chemical Analysis (9 Priority Parameters)	Deepwell Sources	Sampling	Semi-Annually	DOH accredited lab	Senior Engineer A, Dept Manager (WTP)	Well rehabilitation, Shock chlorination, Adjustment of Withdrawal Rate/Pump Setting	LWUA

THM Analysis	WTP Treated Water	Sampling	Annually	DOH accredited lab	Senior Engineer A, Dept Manager (WTP)	Maintain optimum chlorine dose, adjustment on chlorine dosing	LWUA

B. AUDIT OF RECORDS

Table 19- Audit of Records

Verification Activity	Location of Activity	Type of Activity	Frequency of Activity	Analyst	Recipient of Result	Action on unusual/ failing result	3rd Party Recipients of Records
Verification of Chlorination equipment calibration	Pumping Stations	Internal audit	Semi annual	Engineer Prod Dept	Manager (Production Department)	SOP for corrective maintenance	
Verification of deepwell history	Office Database	Internal audit	Semi annual	Engineer Prod Dept	Manager (Production Department)	Well Rehabilitation / Well Abandonment	
Verification of Pipeline Management	Office Database /Distribution Network	Internal audit	annual	Engineer Engineering Dept	Manager (EngineeringDepartment)	Conduct investigation on status of pipeline based on the given data and make necessary recommendations for pipeline rehabilitation if necessary	

C. CUSTOMER SATISFACTION

Table 20 – Customer Satisfaction

Verification Activity	Location of Activity	Type of Activity	Frequency of Activity	Analyst	Recipient of Result	Action on Unusual/ failing result	3rd Party Recipients of Records
Customer Feedback	SJW Offices/Collection Office	Survey	Daily	Corp. Affairs Div./GM	PIO/OGM/ C oncerned department	Service Requests/ Investigation	
	PW-SJW Offices (Frontline)	Received complaints (walk-in/hotline/e-mail)	Daily	Officer, Customer Service Section	Concerned department /BM	follow-ups	

VIII. MANAGEMENT PROCEDURES

Management procedures or most referred to as Standard Operating Procedures (SOPs) is a procedure specific to the operation that describes the activities necessary to complete tasks in accordance with industry regulations, laws or even just the own standards for running the business or in this case, the process of providing safe drinking water to San Jose Water's concessionaires. These procedures are documented and are periodically updated particularly in light of implementation of the improvement/upgrade plan, review of incidents, emergencies and close adversities. It also includes documentation of the system assessment, monitoring and communication plans and supporting programs.

San Jose Water/Primewater-SJDMC has three (3) water treatment plants (WTP-1, WTP-2 and WTP-3) with rated capacity of 20,000 m3/day, 30,000 m3/day and 10,000 m3/day, respectively. Standard Operating Procedures (SOPs) were developed for treatment procedures, maintenance of the distribution system and consumer premises to define expected and acceptable practices.

San Jose Water/PW-SJDMC has a Quick Response Team that is on call for repair leaks that happen beyond office hours or during weekends and holidays. The QRT is a composite team from different operating units of PW-SJDMC.

San Jose Water developed a Crisis Management Plan (CMP) which aims to ensure, in emergency and disaster situations, the least possible impact on water supply and San Jose Water/PW-SJDMC public image through an effective response that contributes to preserving the health and life of the population. The Crisis Management Team and the Crisis Response Team will be activated at once the on set of a crisis.

To maintain San Jose Water/PW-SJDMC effectiveness and efficiency in providing safe and potable water to the city, it is important to perform regular monitoring of each process step and perform necessary corrective actions for every deviation from operational limits, incident response reports are consistently recorded and kept for future reference.

These reports are documented, updated and readily available when the need arises. These documents are written in detail to provide sufficient work instructions and assurance of operational control when performed by competent and well-trained operators.

STANDARD OPERATING PROCEDURES

Water Treatment Plants

A. WATER SAMPLE COLLECTION

The objective of water sampling is to collect a representative portion of the point source enough to test for analytical and bacteriological purposes.

Materials:

1. Sample Bottle
    a. Sterilized glass bottle for Bacteriological analysis
    b. Plastic bottle for Physical and Chemical analysis
2. Ice box and ice pack
3. Lighter
4. Cotton swab
5. Sodium Hypochlorite
6. Pocket Colorimeter Test Kit

Procedure:

Sample Collection for Physical and Chemical Analysis:

a. Open the tap and flush the water for 1 to 2 minutes.
b. Collect sample and test for chlorine residual using the pocket colorimeter test kit.
c. Fill the bottle container with sample without rinsing. Replace cap.
d. Write the date and time of sampling, name of collector, sampling location and type of sample.
e. Place sampling bottles in a cooler during storage and transport.
f. Transport the water sample to the laboratory immediately within 6 hours after collection or within 24 hours after collection under proper storage condition. **g.**

Sample Collection for Bacteriological Analysis:

a. Collect samples that are representative of the water being tested.
b. Open tap to flush water, wipe using cotton swab. After cleaning, flush the tap for 1 to 2 minutes.

c. Close the tap and sterilize it by flaming it with ignited cotton swab. For plastic tap, sterilize with cotton swab soaked in 100 mg/L sodium hypochlorite solution.

d. Open the tap and allow water to flow for 1-2 minutes.

e. Keep sample bottle closed until it is filled. Remove cap carefully to avoid contaminating the inner surface of the cap and neck of the bottle.

f. Fill the bottle with the sample; leave enough air space in the bottle to allow for proper mixing before examination. Fill container without rinsing. Replace the cap immediately. The volume of sample should be sufficient to carry out all tests required (not less than 100 ml).

g. Write the date and time of sampling, name of collector, sampling point code on the label.

h. Place sampling bottle in a cooler with ice or ice pack. Do not submerge the bottle in ice water during storage and transport.

i. Transport the water sample to the laboratory immediately within 6 hours after collection or within 24 hours after collection under proper storage condition.

B. CHEMICAL DOSING

Water treatment chemicals used in the treatment process are namely: PAC (Poly Aluminum Chloride), Chlorine Gas and Liquid Calcium Hypochlorite.

PAC is used as a coagulant to remove turbidity in the raw water and formed as flocs. Chlorine gas is used for pre-chlorination to prevent formation of algae in the water structure as well as destroy the microorganism present in water, while liquid calcium hypochlorite is used in the post-chlorination to maintain chlorine residual enough to meet the standard for PNSDW and ensure safety of drinking water for our consumers.

Chemicals:

a. Poly aluminum chloride

b. Chlorine Gas

c. Liquid Calcium Hypochlorite **Procedure:**

I. Chemical Dosing for Poly Aluminum Chloride

1. Determine the turbidity of raw water inlet using the turbidimeter.
2. At any given turbidity value, the PAC DOSE shall be computed as follows:

No.	Turbidity Range	DOSING FORMULA, PAC Dose in ppm
1	up to 10 NTU	PAC dose = $1(T_{NTU})$
2	*11 - 50 NTU	PAC dose = $0.95(T_{NTU}) + 15$
3	51 - 75 NTU	PAC dose = $1(T_{NTU}) - 10$
4	76 - 100 NTU	PAC dose = $0.95(T_{NTU}) - 15$
5	101 and above	PAC dose = $0.04(T_{NTU}) + 85$

Note: The above were middle point values based on historical figures. Actual needed dose may vary depending on raw water quality. Duty Chemist should verify optimum dose from time to time.

3. Compute the PAC feed rate using the formula:
   PAC Feed Rate, L/Hr = (PAC DOSE, ppm x Flowrate, CMH)/1,190 g/L
4. Inform the duty plant technician/operator on the settings needed for adjustment in the dosing pump based on the computed value for PAC Feed Rate.
5. Verify the actual volume displaced by the dosing pump in the chemical control room. Inform the duty plant technician of any adjustment needed once the verification is completed.
6. Compute for the actual PAC Dose and record the data in the Water Quality Monitoring Form.
7. Conduct Jar Testing Activity to verify the optimum dose for the current water quality and adjust as needed.

II. Chemical Dosing for Chlorine Gas

1. Given the raw water turbidity, compute for the Chlorine Gas Feed Rate, it must be able to have a 0.3ppm - 0.4ppm chlorine residual left in the filtered water outlet.
2. Inform the duty plant technician/operator on the settings needed for adjustment in the chlorinator based on the computed value for Chlorine Gas Feed Rate.

3. Measure the chlorine residual of filtered water using the pocket colorimeter to verify optimum chlorine dose. Take note of the detention time it would take before the dose will take effect on the filtered water before measuring the chlorine residual for verification.
4. Inform the duty plant technician of any adjustment needed once the verification is completed.
5. Compute for the Chlorine Dose using the formula:
   Chlorine gas Feed Rate, g/hr / Flowrate, CMH =CHLORINE DOSE, ppm
6. Record the data in the Water Quality Monitoring Form.

III. Chemical Dosing for Liquid Calcium Hypochlorite

1. Compute for the Liquid Calcium Hypochlorite Feed Rate, it must be able to have a 0.7ppm - 0.8ppm chlorine residual at the treated water outlet.

2. Compute for the Liquid Calcium Hypochlorite Feed Rate in mL/min at 100% pulse setting using the formula:

Liquid Calcium Hypochlorite Feed Rate, g/hr = CHLORINE DOSE, ppm / Flowrate, CMH

Feed Rate in Liters per hour:

Liquid Calcium Hypochlorite Feed Rate, L/h = Liquid Calcium Hypochlorite Feed Rate, g/hr / (75 g Chlorine/Liter of Solution)

Feed Rate in mL/min:

Feed Rate in mL/min = Feed rate in L/h x (1000mL/1L) x (1hr/60 min)

Note: Compute the feed rate in mL/min using ratio and proportion if the setting of the dosing pump is not at 100% pulse.

3. Inform the duty plant technician/operator on the settings needed for adjustment in the pump based on the computed value for Liquid Calcium Hypochlorite Feed Rate.
4. Measure the chlorine residual of treated water using the pocket colorimeter to verify optimum chlorine dose. Take note of the detention time it would take before the dose will take effect on the treated water before measuring the chlorine residual for verification.

5. Inform the duty plant technician of any adjustment needed once the verification is completed.
6. Compute for the actual Chlorine Dose using the formula:

Liquid Calcium Hypochlorite Feed Rate, g/hr / Flowrate, CMH =CHLORINE DOSE, ppm

7. Record the data in the Water Quality Monitoring Form.

C. COAGULANT JAR TEST

The raw water quality continually changes thus, the optimum dose of coagulant cannot be determined from the results of a water analysis. The Jar Test is used to evaluate the coagulation – flocculation component of the water treatment process. The test is used to determine the optimum dosage of coagulants, flocculation aids and other water treatment chemicals.

Chemicals:

Poly Aluminum Chloride

Materials:

Pipettor

Floc Jar, 2000mL

Jar Tester

Beaker, 50Ml

Procedure:

I. Raw Water Sample Collection

a) Use raw water sample tap in laboratory to fill six floc jars with raw water.
b) Tip out excess water so each floc jar contains exactly 2000mL.

II. Add Coagulant Dose

a) Place floc jar filled with raw water on flocculator.
b) Add different (increasing) dosages of PAC to each floc jar based on the PAC dosing formula reference table. Compute for the PAC dose with increments suited for the six floc jars.
c) Turn ON the main power switch and Floc Illuminator switch.
d) Adjust the setting of the jar tester under the “run sequential” mode with the following settings:

1. Rapid Mixing: 2 minutes @ 80 RPM
2. Slow Mixing: 20 minutes @ 40 RPM
3. Settling: 15 minutes @ 0 RPM

e) Press the START button to begin the stirring operation.

f) Observe the floc size and time of floc formation at the end of the first setting. Record using Jar Test Form.

g) The jar tester will continue to operate with the second stirring setting.

h) Observe the floc size and time of floc formation at the end of the second setting. Record using Jar Test Form.

i) In the third setting, the settling operation collects water sample after 5 minutes, 10 minutes and 15 minutes. Test the water samples collected for turbidity, pH, and temperature.

j) Record using the Jar Test Form.

Note: The trial is successful if it proceeds with the initial formation of very fine floc particles, which gradually increase in size to large heavy floc with clear water between. If no floc has formed, the trial is probably a failure and other dosages should be tried.

III. Selection of Required Chemical Dose

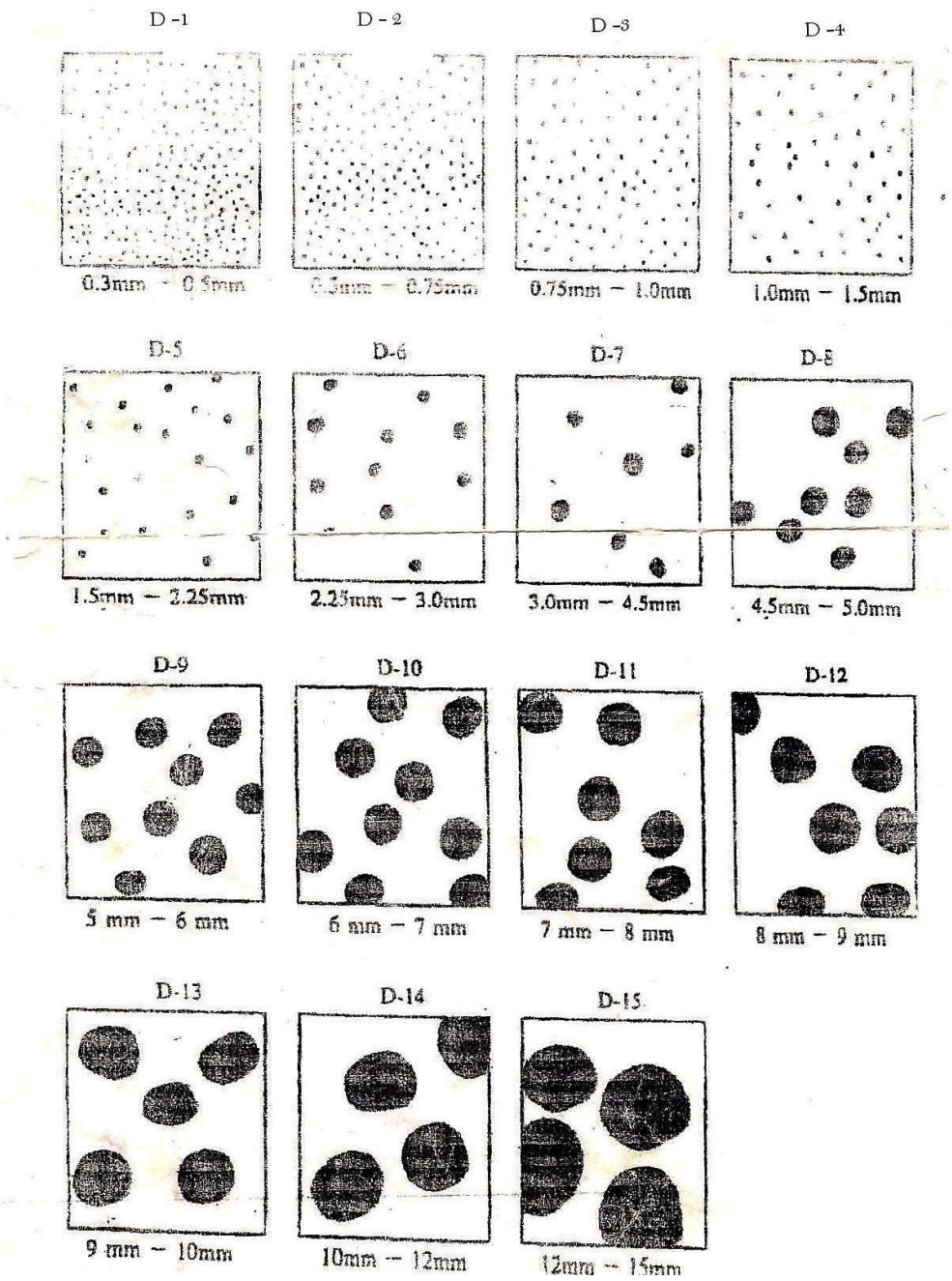
a) The optimum dose is that which gives the best result using the least amount of coagulant. Repeat the Jar Test if a wide range of coagulant doses were used in the first Jar Test.

b) A coagulant underfeed will cause the water sample to appear cloudy, with little or almost no floc formation and no settling.

c) A coagulant overfeed will form dense floc, easily breaks, and will not settle.

d) A good floc formation will appear heavy and tight, with spaces clear between the particles and begin to settle as soon as the stirrer is turned off.

FLOC SIZE CHART



WATER QUALITY/ TREATMENT PROCESS MONITORING AT THE PLANT

The water quality monitoring at the treatment process involves on-line monitoring of the quality of raw water. Also checking of the basic water quality parameters which are turbidity, residual chlorine, alkalinity, iron, manganese, pH, and temperature per stage of treatment process to assess the effectivity of the applied treatment chemicals. These parameters are measured based on the following conditions:

RAW WATER CONDITION	TYPE OF SAMPLE	PARAMETER	FREQUENCY
Sudden increase in raw water turbidity	Raw Water	Turbidity	Every 15 minutes or as needed
	Raw & Treated Water	pH	Every 2 hours
		Manganese	As per advise*
		Iron	
		Alkalinity	
	Pre-filtered Water @ CoCoDAFF	Turbidity	As per advise*
	Filtered Water/Treated Water	Turbidity	Every hour
	Treated Water	Residual Chlorine	Every hour or as needed
Prolonged turbidity of <10 NTU	Raw, Filtered & Treated Water	Turbidity	Every 3 hours
	Raw & Treated Water	pH	Once every shift
		Manganese	Once every morning shift
		Iron	
		Alkalinity	
	Treated Water	Residual Chlorine	Every 2 hours or as needed
Prolonged turbidity of 10-30 NTU	Raw, Filtered & Treated Water	Turbidity	Every 3 hours
	Raw & Treated Water	pH	Twice every shift
		Manganese	Once every shift
		Iron	
		Alkalinity	
	Treated Water	Residual Chlorine	Every 2 hours
Prolonged turbidity of > 30 NTU	Raw, Filtered & Treated Water	Turbidity	Every 2 hours
	Raw & Treated Water	pH	Every 3 hours
		Manganese	Once every shift
		Iron	

		Alkalinity	
	Treated Water	Residual Chlorine	Every 2 hours
Monitored increase in level of manganese (>0.40 mg/L) in raw water	Raw & Treated Water	Manganese	Every 2 hours or as advise*
Monitored increase in level of iron (>1.0 mg/L) in raw water	Raw & Treated Water	Iron	Every 2 hours or as advise*

Distribution System

Pipeline maintenance

SOPs on Repairs

The repair on transmission line, distribution line and on service line are being conducted by the San Jose Water personnel. There are also instances wherein the preparation and the repair are handled by San Jose Water contractors. As such the contractor shall conduct the excavation, breaking of pavement, expose damaged pipelines and conduct the repair. San Jose Water personnel will provide the materials needed in the repair. The inspector shall approve the repair and recommend the payment for the completed Job Order.

When leaks happen during weekends, holidays and nighttime, the repair will be handled by the Quick Response Team (QRT). The QRT was established in the late 90's. It is composed of a supervisor and two teams (first team and second team). These two teams have two maintenance personnel each. The number of maintenance personnel to be utilized depends on the extent of the activity. The first team is always the priority to be pulled-out.

During the initial report of the leaks, the Production & Distribution Department through its roving operator shall evaluate the situation if it is needed to isolate the area. The Production & Distribution Department will decide on the following to determine if immediate interruption is needed:

1. Immediate Water Supply Interruption

    a. If the volume is too much that the leak will cause damage to roads and properties.
    b. If the location of leak is far from bodies of water containing potential contaminants.
    c. If there are few service connections in the affected water system.

2. Reduction of Water Pressure Prior to Repair

a. If a pipeline is situated in residential areas wherein there is adjacent drainage system.
b. If there is no threat of damage to roads or property.
c. If there are many service connections that will be affected. Normally the repair is scheduled at night.
d. If the pipeline is situated underneath a body of water such as a creek or river.
e. If the flow is tolerable that it is somehow similar to the flow of a leaking service connection.

The SOP in the preparation for the repair are as follows:

1. Interruption will be based on the situations mentioned earlier.
2. If there are threats of entering contaminants while preparing for the repair, excavation will be made without water supply interruption. Reduction of water pressure will be applied.
3. Total supply interruption shall only be made once water is below the level of the pipeline.

In case of a leak on service lines there will be no water interruption to be made. Water interruption can only be applied on bigger sizes starting from ¾" Ø wherein pressure cannot be contained by maintenance personnel. Pressure will dictate if interruption is needed to repair the leak on service connections.

Response Plan for Emergency Operation Activities

The emergency response plan is vital during natural calamities since this fortuitous event can seriously affect the water supply service. The SJDMWD/PWIC established the EMERGENCY MANAGEMENT AND RESPONSE MANUAL – DRRMP for necessary procedures to quickly and effectively mobilize existing resources once an emergency arises.

IX. SUPPORTING PROGRAMS

In 2011, San Jose Water engaged to a Water Operator Partnerships (WOPs) or "Twinning" Partnership Program. It is an approach that enables peer-to-peer exchange of knowledge and experience between two water utilities. A utility (recipient twin, in this case – the San Jose Water) that seeks to improve its performance and service delivery pairs with a stronger utility (mentortwin–K-Water) to learn from.

The Water Operator Partnership between K-Water and San Jose Water strengthened capacities to provide improved water quality. K-Water exposed its recipient twin to practical solutions, introduced new methodologies which resulted to increased customer satisfaction on San Jose Water's side.

The partnership also provided information and data for decision and policy making of San Jose Water's management. San Jose Water was able to adapt and adopt relevant best practices, solutions, approaches, assign and involve relevant staff.

As such, the WSP team with the approval of San Jose Water management formulated more supporting programs to support the delivery of safe drinking water. These programs will be coordinated and synchronized with other departments programs which seek to achieve one common goal - to serve all the residents of the City of San Jose Del Monte with equitable, reliable and immediate access to safe and potable water twenty-four hours a day at the least possible cost.

These activities do not directly affect water quality but are meant to ensure that no additional source of potential hazards will come from the operating/surrounding environment, the equipment's used and the people themselves, employees andvisitors alike.

Table 23-Supporting Programs

Program	Purpose	Specific Activity	Target Date of Implementation
Calibration	To maintain accuracy and reliability of equipment monitoring	a. Chemical Dosing Pumps	Quarterly
		b. Laboratory Instruments	Semi-annually
		c. Flowmeters	Semi-annually
		d. Well pumps	Semi- Annually
Preventive Maintenance	To prevent unnecessary malfunctions in the process and maintain effectiveness of strategies implemented	a. Electro-mechanical facility wtps, deepwell stations, booster stations	Quarterly
		b. Storage/reservoir facilities	Annually
		c. Cleaning of raw and clear water tank	Annually
Hygiene and Sanitation	To prevent personnel and equipment from introducing hazard to the water	a.Sealing of stocked pipe	3rd quarter of 2023

		b. Wearing of PPEs for personnel indirect contact with clean water	3rd quarter of 2023
Training	To ensure personnel familiarity and understanding with water safety and the implications of their actions	a. Water Resources Facilities Operators'Course (Production Department)	3rd quarterof2023
		b.Water Quality Management (WTP Department)	3rd quarter of 2023
		c. Understanding the Concept of Water Contamination (Production and WTP Deaprtment)	3rd quarter of 2023
		d. Water Supply Materials Selection and Quality Assurance (WTP Department)	4th quarter of 2023

X. Periodic Review of WSP

The world's real situation is unfathomable. The existence of climate change induces weather-related disasters that could be very destructive to human life and settlement. New cases of potentially harmful viruses and bacteria cause contamination of the environment. Further, there are threats of terrorist attacks where water service could be compromised orinterrupted.

With these real-life situations San Jose Water/PW-SJDMC is facing, it is necessary that the WaterSafety Plan shall be reviewed at least once a year, every 2nd week of February to ensure that new risks threatening the water sources, production and distribution of safe water are regularly assessed and addressed. An updated Water Safety Plan will ensure the employees and stakeholders confidence and support in the WSP approach. San Jose Water/PW-SJDMC water quality management system consists of a stage-by-stage analysis, making sure that no possible hazard could always enter the system.

After the implementation of the Water Safety Plan, the procedures and records should be reviewed to confirm that plan is being carried out. This is called periodic auditing. An audit-based approach places responsibility on every unit involved to provide information regarding system performance against agreed indicators. It is the collection of data to evaluate the level of conformance to the quality system as indicated in the WSP as well as the degree of compliance to regulatory requirements.

Periodic auditing also involves the completion of actual input for management decision, determines if company is at risk, identifies areas or opportunities for improvements, assesses individual performance, assists company staff training needs, improve communication and motivation ofpersonnel.

Furthermore, there will be revisions in the WSP Team once the following changes takeplace:

1. Career movement
2. Resignation or retirement of members
3. Change of contact numbers
4. Expansion of the WSP Team

To guarantee the effectiveness of the audit system, the audit requires an Internal Audit procedure which will serve as an assessment of the WSP. The auditors should have no direct involvement with the auditee but are qualified enough to have a technical lunderstanding of the audit area.

Since the team is composed of water quality management experts from Operation and Technical Services Group, the WSP will be audited by representatives from the Administration Services Group.

XI. REVISE THE WSP FOLLOWING AN INCIDENT

The team will review the WSPat least once a year or as deemed necessary to ensure that occurring hazards and issues are covered. The development of the Water Safety Plan ensures a decline in the number and severity of incidents affecting or would possibly affect the quality and safety of water distributed to the concessionaires. However, such incidents may still take place.

It is therefore necessary to review and/or revise the WSP following every emergency, incident, or unforeseen event or near misses to guarantee that the same incident/emergency will not recur in the future and to determine whether the response was effective or needs to be improved.

Most likely, the results of a post incident review will determine the areas for improvement of the WSP whether it is a new hazard, or a revised risk for the risk assessment, a revision for an operating procedure or a training issue. It is important that the WSP must be revised so that changes may be reflected and lessons from WSP documentation and procedures are incorporated.

Standard Operating Procedures:

In case of power failure, operators need to conduct the following procedures:
1. Transfer switch from Meralco to generator set.
2. Check genset oil, water, battery and others.
3. Switch on the generator set.
4. Warm-up for 15 minutes.
5. Start pump and motor using generator power.
6. Resume normal operation.

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In case of clogged chlorinator nozzle, operators need to conduct the following procedures:
1. Turn off the chlorinator pump.
2. Remove the nozzle from the chlorinator pump by turning it counterclockwise.
3. Clean the nozzle by unclogging and removing the crystallized or foreign matter using a sandpaper. Also, remove the Teflon wrap on the nozzle.
4. Replace the removed Teflon tape from the nozzle with a new Teflon tape.
5. Return the cleaned nozzle with a new Teflon tape to the chlorinator pump by turning it clockwise this time.
6. Turn on the chlorinator pump.

In case of flood reaching the well, operators need to conduct the following procedures:
1. Shut off the well.
2. Call Maintenance Head to inform the situation.
3. Maintenance Head informs the General Manager.

In case of flood reaching the well, operators need to conduct the following procedures:
1. Shut off the well.
2. Call Maintenance Head to inform the situation.
3. Maintenance Head calls General Manager to inform the incident.

In case of pump operator suddenly felt sick and needs to go home, operators need to conduct the following procedures:
1. Operator calls Maintenance Head to inform situation.
2. Maintenance Head assigns reliever for the sick operator.
3. Reliever goes to pump station and relieves the sick operator.
4. Sick operator endorses his post to the reliever and goes home, if possible, logs out and have his DTR signed up at the office by the Maintenance Head, HR, of Division Chief.
5. Maintenance Head informs the HR of the date and time the sick operator left his post.
6. HR takes note of the date and time the sick operator left his post.
7. Reliever checks the psi reading and chlorinator.

In case of positive bacteriological test result, Production Head needs to conduct the following procedures:
1. The production head reports the Bacteriological Test Result to the Technical Head.
2. Flushing of distribution lines for 30minutes where bacteriological test results of high Total Coliform and HPC level based on PNSDW standards.
3. Test Residual Chlorine.
4. Gather sample from the same area that bacteriological test results of high Total Coliform and HPC level based on PNSDW standards.
5. Deliver samples to the laboratory for retesting.
6. Claim Bacteriological Test Result from the laboratory.

If the results turn out to be positive again, a longer flushing duration is conducted to ensure that the distribution line is free of coliform and other foreign bodies. Then repeat procedure 4-6 until a negative result is obtained.

In case of pump station trespassing incident or theft, operators need to conduct the following procedures:
1. **Operators calls Production Head.**
Production Head reports the incident to Brgy/PNP and Head of Agency.
2. **PNP conducts investigation.**
3. **Operators prepare incident report.**
4. **Operator submits report to Production Head.**
5. **Production Head forwards and recommends possible action to Head of Agency.**
6. **Head of Agency verifies the incident and give orders.**

Acknowledgment

This WSP Manual was conceived through the efforts of each department of San Jose Del Monte City Water District/PW-SJDMC. Each recorded data and information from each department has become valuable in the development of this manual. The documented accounts, particularly those that occurred beyond the normalcy in the water system aided the team in identifying the risks that could endange r the quality of water being delivered to the concessionaires.

San Jose Del Monte City Water District wishes to acknowledge Maynilad Water Services Inc., which Water Safety Plan Manual served as guide for the development of San Jose Del Monte City Water District's WSP Manual. Maynilad's La Mesa Water Treatment Plant has the same water treatment technology with San Jose Del Monte City Water District's Water Treatment Plant No. 1 thus several issues and some areas in this manual was created using Maynilad's WSP Manual as one of the references. These similarities aided the WSP team to come up with its own water safety plan appropriate to the size and structure as well as the treatment procedures of San Jose Water's Water Treatment PlantNo.1.

Likewise, this manual would not have been possible without the directions from WSP Manual Guide provided by the World Health Organization and the International Water Association. Some points and ideas from the WSP manuals of Davao City Water District and Guimba Water District have also been helpful to the creation of this manual. San Jose Water is truly grateful to the substantial support the above-mentioned water districts provided.

Finally, San Jose Water is in debt of gratitude to Engr. Maria Sonabel S. Anarna and Engr. Arturo B. Fernando of who unselfishly shared their wisdom and expertise in the creation of this Water Safety Plan.

List of Abbreviations

WSP	-	Water Safety Plan
K-Water	-	Korean Water Resources Corporation
DOH	-	Department of Health
SPRP	-	Sapang Palay Resettlement Project
MWSS	-	Metropolitan Waterworks and Sewerage System
ABWSSP	-	Angat Bulk Water Supply System Project
PAC	-	Polyaluminum Chloride
PNSDW	-	Philippine National Standards for Drinking Water
CWSSP	-	Comprehensive Water Supply System Project
FABS	-	Fresh Air Booster Station
ACP	-	Asbestos Cement Pipe
WTP1	-	Water Treatment Plant Number 1
WTP2	-	Water Treatment Plant Number 2
EBS	-	Encanto BoosterStation
PYBS	-	Pulong Yantok Booster Station
MBS	-	Metrogate Booster Station
NHA	-	National Housing Authority
SOP	-	Standard Operating Procedures
DPWH	-	Department of Public Works and Highways
MERALCO	-	Manila Electric Company
CEO	-	City Engineer's Office

LGU	-	Local Government Unit
PEO	-	Provincial Engineer's Office
DMA	-	District Metering Area
NRW	-	Non-Revenue Water
IEC	-	Information, Education, Campaign
WQMS	-	Water Quality Management Section
MSSS	-	Maintenance and Support Services Section
WDS	-	Water Distribution System
WRFO	-	Water Resources Facilities Operator
SWUMO	-	Senior Water Utilities Management Officer
PPDC	-	Provincial Planning and Development Council
BWS-DD	-	Bulk Water Supply and Distribution Department
PDCPLC	-	Planning and Design / Construction & Pipeline Leakage Control
SCWMM	-	Service Connection Water Meter Maintenance
LWUA	-	Local Water Utilities Administration
BBWSP	-	Bulacan Bulk Water Supply Project
PW-SJDMC	-	Primewater-San Jose del Monte City

Glossary of Terms

Alkalinity – the quantitative capacity of an aqueous solution to neutralize an acid. Measuring alkalinity is important in determining a stream's ability to neutralize acidic pollution from rainfall or wastewater.

Aqueduct – a conduit for water; one for carrying a large quantity of flowing water.

Backflow - flow of water in a pipe or line in a direction opposite to the normal flow; often associated with back siphonage or the flow of possibly contaminated water into a potable water system.

Backwash - the upflow orc ounter-current flow of water through a filter, lifting the mineral bed and flushing away to the drain the particles of foreign matter that have been filtered from the water supply during the service cycle.

Calcium Hypochlorite – a white, crystalline compound, $Ca(OCl)_2$, used as a disinfecting and bleaching agent.

Chlorine - a halogen element, a heavy, greenish-yellow, incombustible, water-soluble, poisonous gas that is highly irritating to the respiratory organs, obtained chiefly by electrolysis of sodium chloridebrine: used for water purification, bleach making etc.

Chlorine Dioxide - is a chemical compound with the formula ClO_2 it is a potent and use fuloxidizingagent used in water treatment and in bleaching.

Chlorine Residual – when a sufficient dosage of chlorine is applied to water, microorganisms of sanitary significance are destroyed and there is a reaction on alloxidizable matter. After all these reactions have taken place, at the end of a specified contact time there remains a certain minute quantity of chlorine in the water.

Clarification - is the final part of the process and allows the large flocs containing much of the suspended matter to sink to the bottom of a tank or basin, while the Clear water overflows and is then further treated.

Coagulant – a substance that triggers formation of a soft, semisolid mass in water, to which constituent to be removed are attracted and/or trapped by adhesion; often the constituent become heavy enoughto settle out.

Coagulation – is a water treatment process that promotes aggregation of small particles into larger particles that can be subsequently removed by sedimentation and/or filtration.

Colloid – a dispersion of particles larger than those in true solutions and smaller than those in true suspensions.

Contaminant – materials not normally found in water that make the water less desirable orunfitforitsintended use.

Disinfection – water treatment process designed to destroy disease-causing microorganisms making water safe for humans to drink normally by adding chlorine, chlorine dioxide etc.

Effluent – an outflow of water from a natural body of water or from a sewage treatmen tfacility.

Fecal Coliform – subgroup of coliform bacteria that has a high positive correlation with fecal contamination associated with all warm-blooded animals.

Filter - a device used to clean water by removing iron, silt, taste, odor, color, etc., before it is fed into the softener or supply lines of the consumer.

Filter Media - A media filter is a type of filter that uses a bed of *sand*, peat, shredded tires, foam, crushed glass, geo-textile fabric, crushed granite, or other material to filter water for drinking, swimming pools, aquaculture, irrigation, storm water management and other applications.

Floc

a flocculent mass formed in a fluid through precipitation or aggregation of suspended particles.

Flocculation – to form flocculent masses, as a cloud or a chemical precipitate; form aggregated or compound masses of particles. Increase the cohesion of the floc formed by

coagulation.

Groundwater – water that occurs below the surface of the Earth, where it occupies spaces in soils or geologic strata.

Heterotrophic Plate Count (HPC)-is a procedure used to estimate the number of live heterotrophic bacteria that are present in a water sample. A sample of water is put on a plate that contains nutrients that the bacteria need to survive and grow.

Microorganism – any organism too small to be viewed by the unaided eye, as bacteria, protozoa, and some fungi & algae.

Nephelometric Turbidity Unit (NTU) - the standard unit of measurement used to measure turbidity in water. It makes use of a lights cattering effect of fine suspended particles in a light beam.

Parts Per Million (ppm) - a common basis for reporting the results of water and wastewater analysis, indicating the number of parts by weight of water or other solvent. One ppm equals one pound per million pounds of water.

Polymer – a general term for chemical composed of long chains of molecules of known electrical charge and electrical strength. These compounds aid water treatment by agglomerating (clumping together in bunches) very small particles so that they can settle out of water and/or become trapped infilters.

Precipitate - to cause a dissolved substance to form a solid particle that can be removed by settling or filtering. The term also refers to the solid thus formed.

Raw Water – water as it comes from the source (well, lake, reservoir, river) or untreated water.

Septage – the waste or sewage in a septic tank.

Total Coliform – refers to any rod-shapes, non-spore-forming gram-negative bacteria capable of growth in the presence of bile sales, or other surface-active agents with similar growth-inhibiting.

Trihalomethanes (THM 's) - a group of organic chemicals known to be carcinogenic in more than trace amounts which are produced from chlorination. They reduce the germicidal activity of chlorine in alkaline water.

Turbidity – a cloudiness or haziness of water caused by individual particles that are too small to be seen without magnification.

References

1. Philippine National Standards for Drinking Water 2007 Edition
2. Cityof San Jose Del Monte Ecological Profile 2014
3. Maynilad Water Safety Plan 2012
4. Water Safety Plan Manual: Step by Step Risk Management for Drinking-Water Suppliers
5. San Jose Del Monte City Water District WaterTreatment Plant Operations Manual
6. San Jose Del Monte City Water District Employee's Handbook, Version 2014

ANNEX A

	Board Resolution	B. R. No. : 025-2023 Date Adopted : May 11, 2023 Place Adopted : City of San Jose del Monte Page : Page 1 of 1

RESOLUTION APPROVING THE PROPOSED WATER SAFETY PLAN (WSP) VERSION 2 OF SAN JOSE DEL MONTE CITY WATER DISTRICT AND PRIMEWATER-SAN JOSE DEL MONTE.

WHEREAS, LWUA through Memo Circular No. 010-14 has directed all WDs to develop and implement Water Safety Plan (WSP) and comply with the provisions of DOH Administrative Order No. 2014-0027. The DOH-AO cited that the submission for review, assessment, and approval of WSP are included in the procedures for WSP Processes;

WHEREAS, this 2nd Version of Water Safety Plan (WSP) will be submitted to LWUA for review and evaluation. It will be then forwarded to the Department of Health (DOH) for final approval;

WHEREAS, San Jose Water has previously received its Certificate of Water Safety Plan and Acceptance with Control Number 2018-006 from the Department of Health, which was valid from January 16, 2018 up to January 15, 2021;

WHEREAS, the updated Water Safety Plan was submitted for renewal to LWUA on April 28, 2022, however, it was only last March 23, 2023 when a reply letter was received – that the initially screened and submitted WSP has deficiencies as indicated in the WSP Completeness Review Form;

WHEREAS, the deficiency that concerns San Jose Water is the board resolution approving the Updated Water Safety Plan of San Jose Water and Primewater-SJDM and per information from LWUA, the schedules of water safety plan review will be on May 16-18, 2023 and May 23-25, 2023 hence, the complete copy of Updated WSP should be submitted to LWUA prior to these dates;

NOW THEREFORE, in view of the foregoing and on motion of Dir. Armando Delos Reyes, duly seconded by Sec. Aurelio A. Jose, Jr., ***BE IT RESOLVED,*** as it is hereby resolved, To approve the Proposed Water Safety Plan (WSP) Version 2 of San Jose del Monte City Water District and Primewater-San Jose del Monte.

RESOLVED FURTHER, To furnish the Local Water Utilities Administration with a copy of this resolution, for their reference and guidance.

APPROVED unanimously by the Board present this 11th day of May, Year Two Thousand Twenty-Three.

Certified correct:

MR. AURELIO A. JOSE, JR.
Board Secretary

Attested by:

DRA. JOVITA V. MATEO
Board Chairman

OGM-004-0

ANNEX B

SAN JOSE DEL MONTE CITY WATER DISTRICT
PRIMEWATER INFRASTRUCTURE CORPORATION
SAN JOSE DEL MONTE, BULACAN

PrimeWater
SAN JOSE DEL MONTE CITY

JOINT OFFICE MEMO NO. 2023 – 01

TO : **SJDMCWD/PWIC CONCERNED OFFICERS AND EMPLOYESS**
SUBJECT : **Creation of SJDMCWD/PWIC Water Safety Plan Team**
DATE : **May 22, 2023**

Cognizant to Department of Health issued Administrative Order No. 2014-0024 declaring the development and implementation of Water Safety Plan (WSP) by all drinking water service providers as a National Policy for drinking-water quality management, there is a need to come-out with a DOH Accepted Water Safety Plan in support of the said National Policy and in compliance with the said Administrative Order. Likewise, the Local Water Utilities Administration (LWUA) issued Memorandum Circular No. 010-14 directing all Local Water Districts in the Country to:

a. Adopt the 11-step process of the World Health Organization (WHO) as the main guideline in the development of WSP; and
b. Develop and implement WSP and comply with the provisions of DOH Administrative Order No. 2014-0024.

In this connection and in compliance with SJDMCWD Board Resolution No. 25 Series of 2023 expressing support to this endeavor, directing the SJDMCWD Management in coordination with PWIC San Jose Del Monte Branch, being the SJDMCWD joint venture partner, to create a Water Safety Plan team, the following SJDMCWD/PWIC are hereby designated to compose the Water Safety Plan Team:

Team Leader	Engr. Dave Reanan E. Dawinan Technical Head - PWSJDMC
Co-Team Leader	Rosemarie G. Galvez - Assistant Manager, SJDMCWD
Assistant Team Leader	Engr. Jay V. Limense Department Manager - WTP
Secretariat	Aleszi C. Maestrado Clerk Processor
Technical Group	Engr. Noel Abraham A. Angel
	Engr. Clifford A. Calipusan
	Engr. Jogenes H. Bacinillo
	Engr. Nicole Jan A. Abogadie
	Engr. Nicolas B. Vergara
	Engr. John Joshua Q. Apolong
	Lawrence L. Catabui
	Venancio Cesar S. Blancaflor
	Rommel P. Garcia
	Lamberto A. Sison
	Lorraine J. Ronquillo
	Emmanuel B. Dulman
Customer Sservice	Ruditho B. Atinaja
Administrative and Finance	Cherry E. Limense

The WSP Team is tasked to accomplish the following:

a. **Review and update the existing draft and ensure that the 11 modules required by DOH/LWUA were followed in the development of the WSP;**
b. **Complete the WSP on or before 23 of May 2023 for submission to LWUA for review and eventually the DOH for the issuance of the Certificate of Acceptance.**

For your information.

ENGR. ILUMINADO B. CARAMOL JR.
Branch Manager

ENGR. LORETO G. LIMCOLIOC
General Manager
MAY 23 2023