River Water Treatment Plant

Project: San Jose Water - Philippines

Capacity: 10.0-11.0 MLD (22-24 h/day)

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River Water Treatment Plant – San Jose Philippines

Background

- The initiative to design and build this new water treatment plant was a result of the population increase in the region of San Jose in the Philippines (Luzon island).
- The main functions of the plant are to remove suspended solids, reduce turbidity and disinfect the water, thus providing safe drinking water microbial free with quality that meets the Philippines regulations.
- Yamit Filtration and Water Treatment LTD was selected to supply the water treatment system and equipment for the plant.

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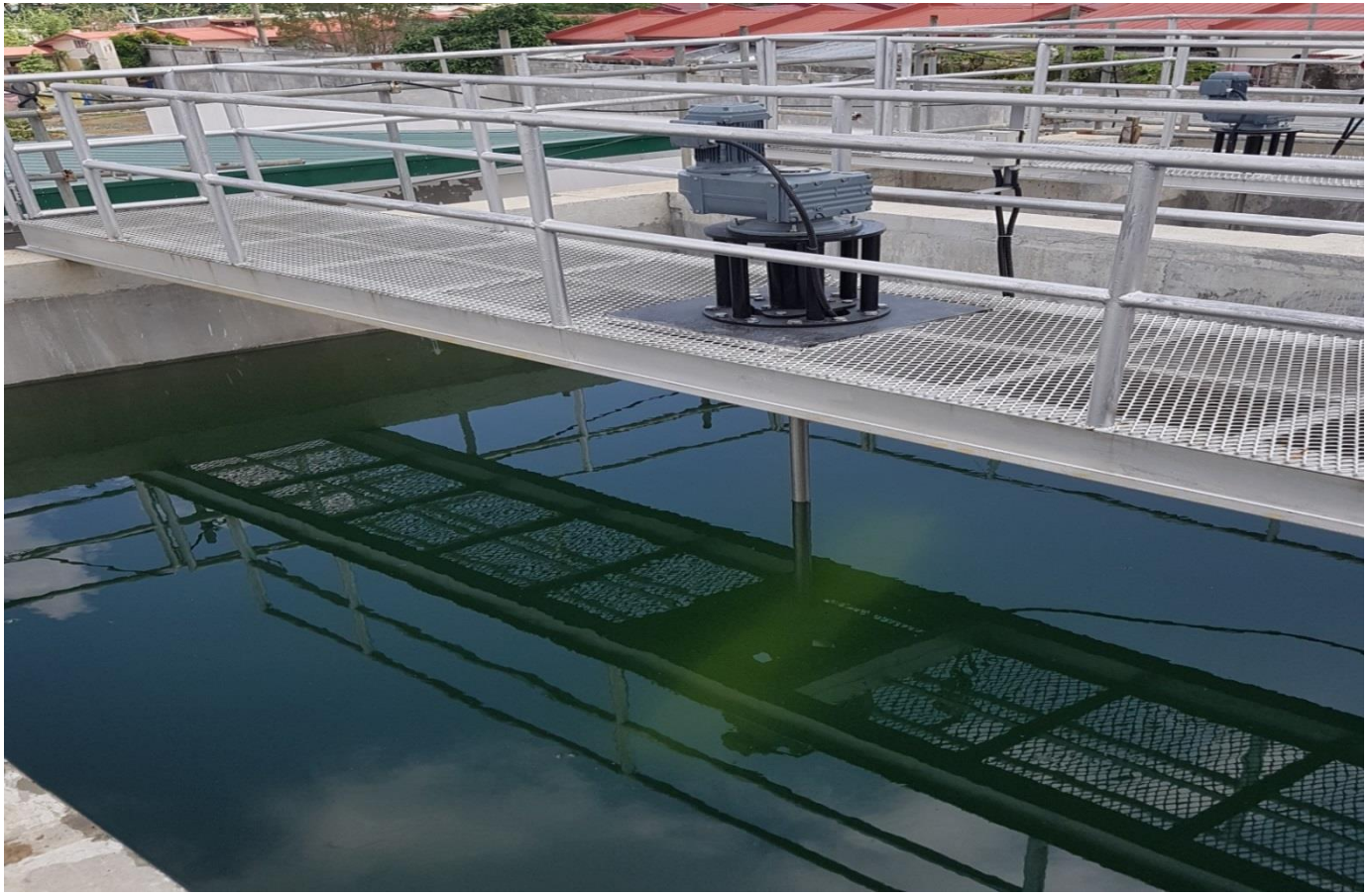
Sedimentation/clarification



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Filtration

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Sludge Lagoon

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Overview

- Surface water from rivers generally requires more extensive treatment then groundwater because of greater exposure to contamination.

- A multi step process is required to produce clean, safe, good tasting drinking water.

- The raw water flows by gravity directly into the treatment plant.

- Design and operation parameters
  Feed flow rate: 454 m^3/h (22 hours/day)
  Feed inlet pressure: 12 meter

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Feed & Produced Water Quality

The expected water quality will meet the following parameters:

Value	Units	Feed Water		Philippines Standard
		Average	Max	
pH		7.3-8.5		6.5-8.0
Turbidity	NTU	30	500	<5.0
TSS	mg/l	10	100	<0.5
Hardness	mg/l	70	160	-
Alkalinity	mg/l	80	250	-
Manganese	mg/l	0.05	0.4	<0.4
Iron	mg/l	0.8	1.0	<1.0
Color	ptCo	15	200	<5.0
TDS	mg/l	70	290	<500

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Process Steps

- Preliminary treatment
- Coagulation and Flocculation
- Clarification
- Filtration
- Disinfection
- Sludge Treatment

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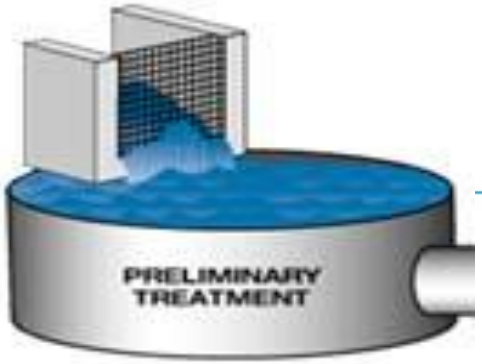
Preliminary Treatment



- Physical, mechanical and/or chemical treatment are utilized before the water undergoes the main treatment.
- The plant preliminary treatment consists of Pre-chlorination dosing system.
- After the source water is screened and passed through the pre-chlorination it is ready for coagulation and flocculation.

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Coagulation & Flocculation

- **Coagulation**
  This process makes lumps out of small particles of suspended matter such as silt and microbes and enables their removal by granular media. The primary purpose is the reduction of turbidity from the water.

- **Flocculation**
  During this stage the heavy dense “flocs” settle to the bottom of the tank.

- **The plant coagulation and flocculation treatment includes:**
  PAC dosing
  Polymer dosing
  Static mixing

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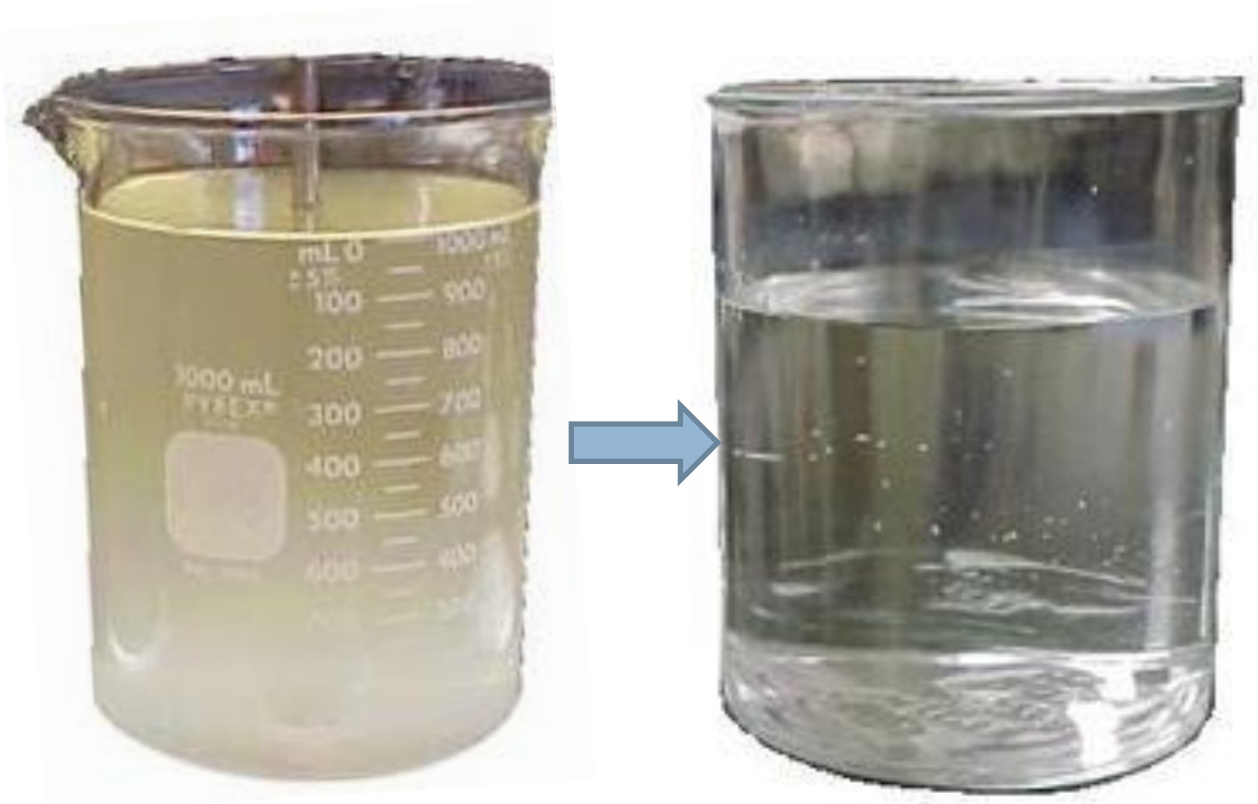
Coagulation & Flocculation



80 NTU

Low Turbidity

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Clarification

- Solids- liquid separation. The sludge is settled in the bottom of the clarifier.
- Two Tube Settler clarifiers were designed for this plant. The clarifiers are Smart-Clarifier type that offer extremely low energy consumption without any moving parts.
- Flow rate for each line is 227 m^3/h (total flow rate is 454 m^3/h).

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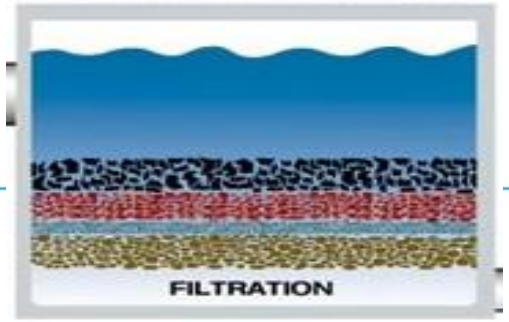
Filtration



- Filtration is a process in which suspended particles are removed so that the required solid content is achieved . The inlet and outlet water quality is measured by total suspended solids (TSS) or turbidity (NTU)

- The plant includes polishing media filter system that is designed to improve the water quality after the clarifier and insure that it meets the required water quality standard.
  The polishing media filter system consists of:
  Feed pumps
  A media filter system
  A control system
  A backwash mechanism

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Disinfection

- Chlorination is the most common method of disinfection. The disinfection is done by dosing sodium hypochlorite to the final effluent. It is essential to monitor the residual chlorine in the treated water.

- The plant includes Post Chlorination Dosing Station.

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Sludge Treatment

- Combination of sludge lagoon and Geotube sleeve system was designed for the dewatering and treatment of the sludge that exits the clarifier.

- The lagoon regulates the quantity of sludge that flows toward the treatment process.

- The Geotube dewatering System
  A Geotube sleeve is made of a special fabric that lets the water out and retain the sludge inside.
  The sludge is drained to a level of 20% to 40% dry material.

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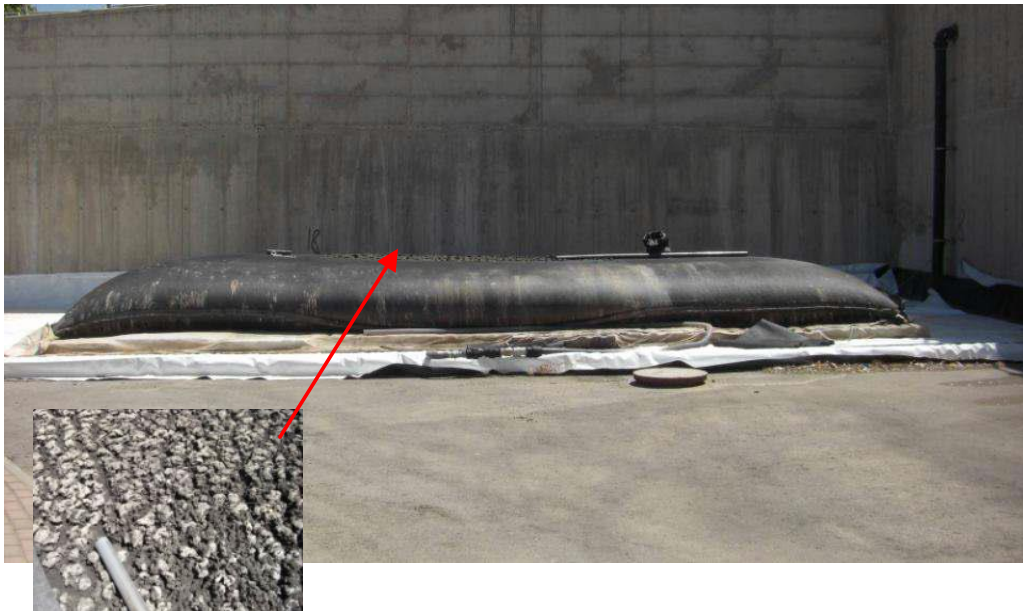
Sludge Treatment

Clean Water
Coming Out of the GeoTube



Dewatered Sludge

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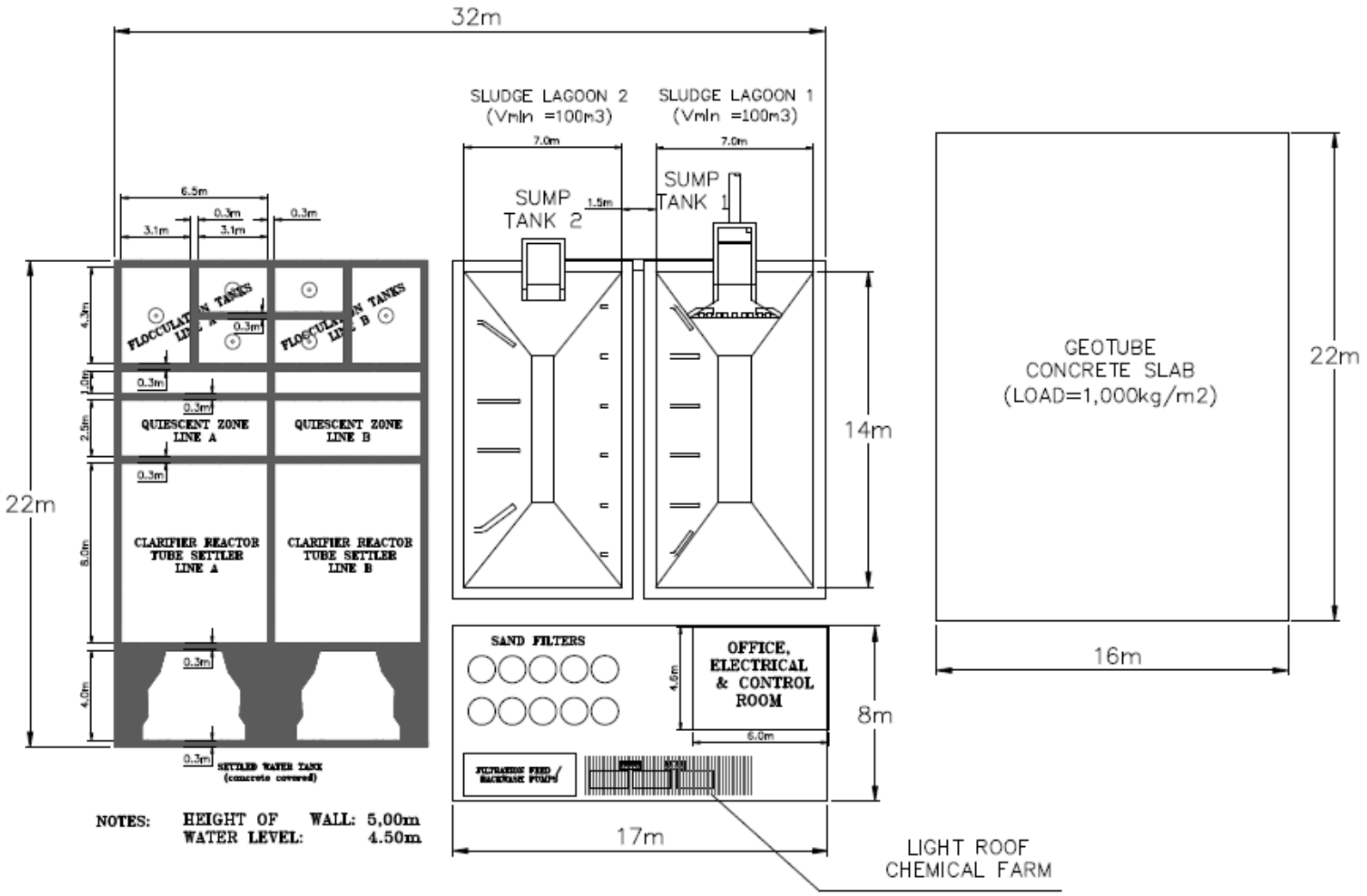
General Plant Layout and P&ID



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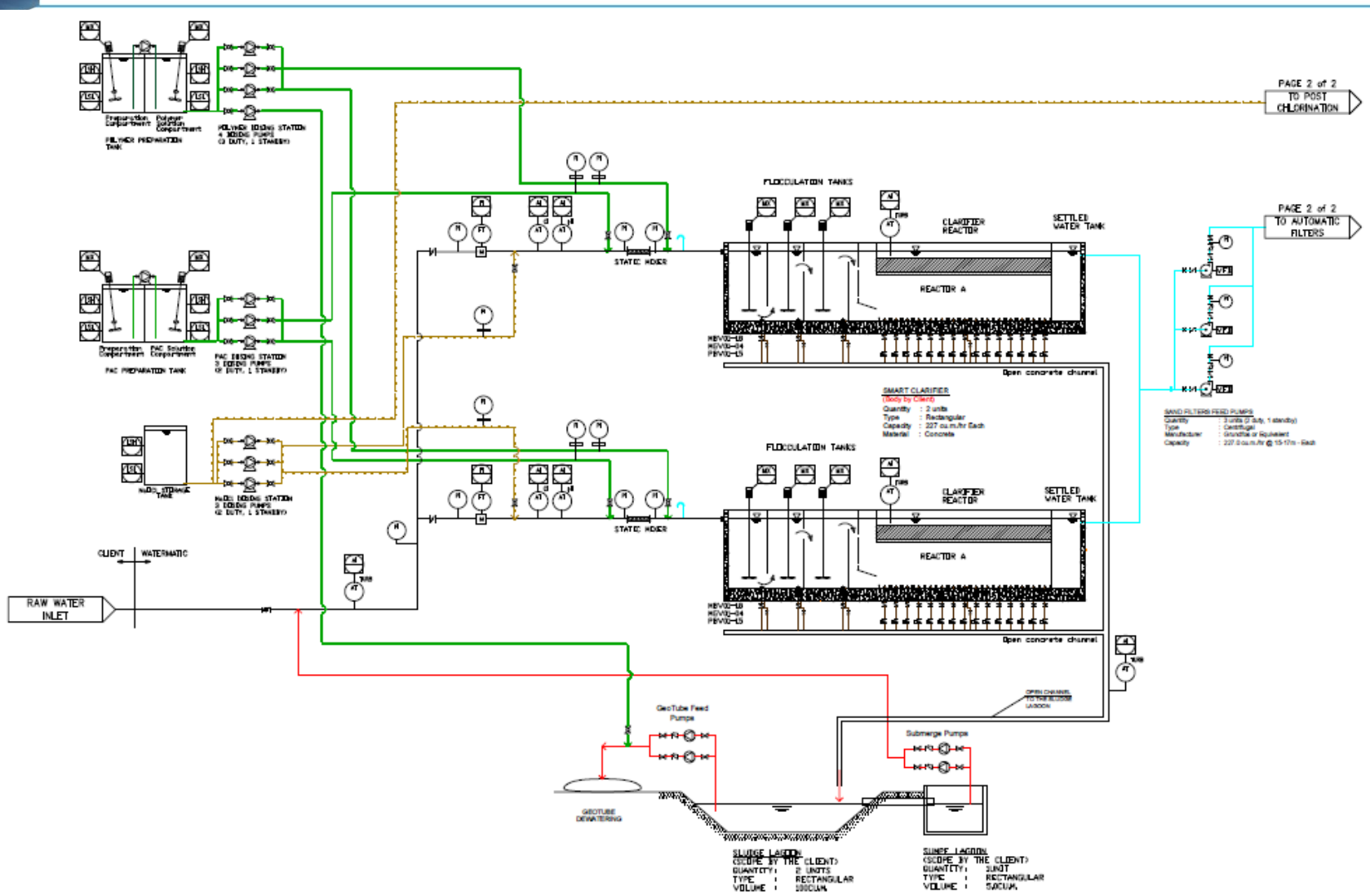
General Plant Layout and P&ID



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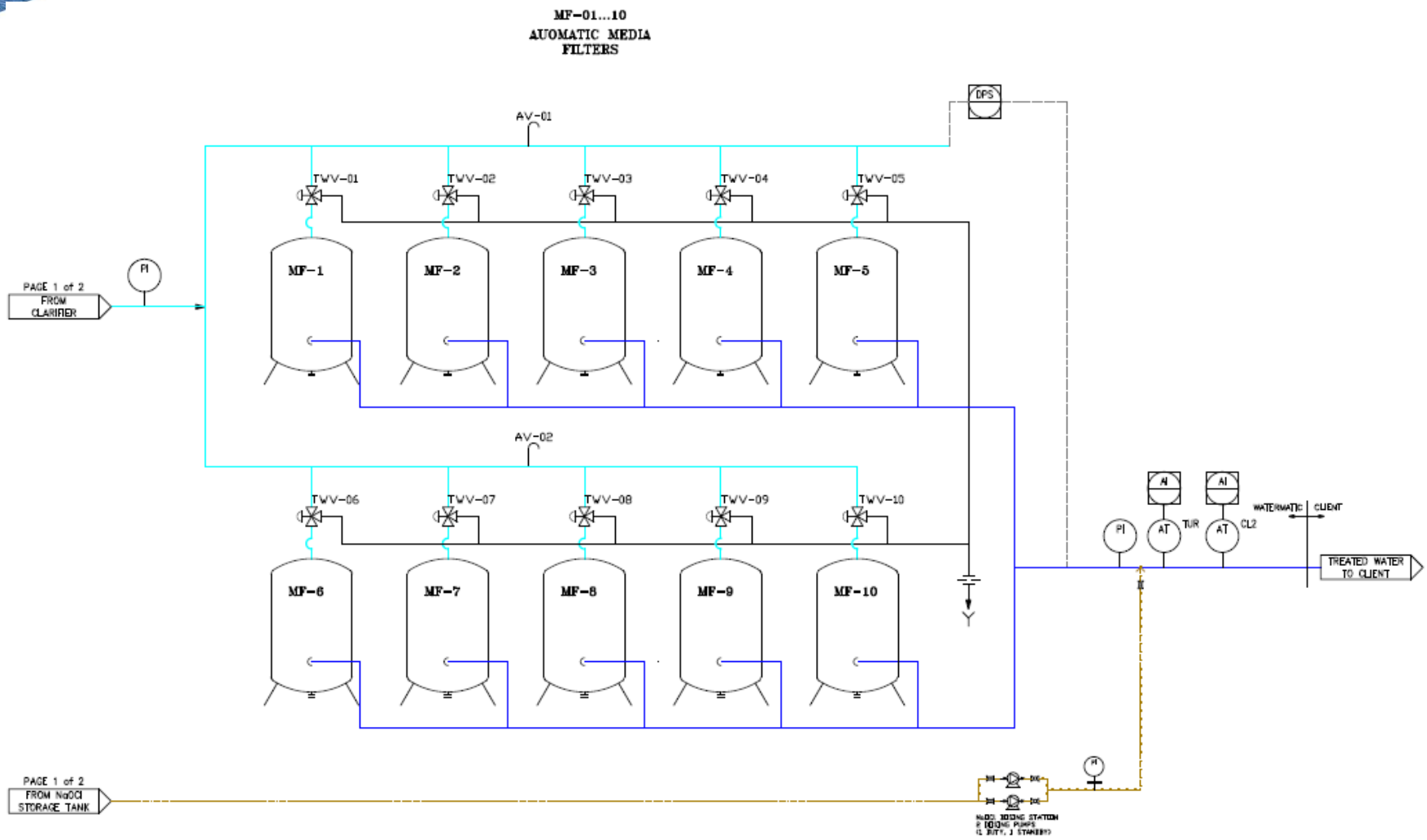
General Plant Layout and P&ID



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