

Design Criteria Plumbing System Ibis Hotel Margonda – Depok

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1. SCOPE OF WORKS

Plumbing Scope of Works Including:

1.1 Clean Water Installation

Clean water installation starting from clean water source to water usage fixture including reservoir, hydrosphere & pumps.

1.2 Hot Water Installation

Hot water installation including air to water heater system unit and hot water supply for all hotel rooms and kitchen appliances.

1.3 Waste Water and Sewage Water Installation

Waste water and sewage water installation to sewage treatment plant and also from treatment plant to city sewage collection drainage.

1.4 Venting System

Providing venting from sewage water and waste water systems.

1.5 Rain Water System

Providing pathway for rain water from rooftop to city collection drainage.

2. DESIGN CRITERIA

2.1 Table Cold Water:

| | |
|-----------------------------------|------------------------------|
| Capacity | 200 m ³ effective |
| (2 compartment) | |
| Estimated daily water consumption | 72 m ³ |
| Firefighting water usage | 128 m ³ |
| Construction | concrete |

| | |
|---------------|----------------------|
| Transfer Pump | |
| Capacity | 4,2 x 210 LPM, 8 bar |
| Type | Centrifugal pump |

| | |
|------------|-------------------------|
| Casing | Cast iron / SS |
| Impeller | Cast iron / SS / bronze |
| Shaft | SS |
| Shaft seal | Mechanical seal |
| Speed | 2900 rpm |
| Operation | 1 duty, 1 standby |

Booster Pump

| | |
|------------|---|
| Capacity | 3 x 200 LPM, 1,5 bar |
| Type | Package centrifugal pump |
| c/w VSD | |
| Casing | Cast iron / SS |
| Impeller | Cast iron / SS / bronze |
| Shaft | SS |
| Shaft seal | Mechanical seal |
| Speed | 1450 rpm |
| Operation | Parallel alternate operation with variable speed (2 duty – 1 standby) |

Deep Well Pump

| | |
|------------|---------------------------------|
| Capacity | 12 m ³ /hour, 15 bar |
| Type | Submersible Multy Stage |
| Casing | Cast iron / SS |
| Impeller | Cast iron / SS |
| Shaft seal | SS |
| Speed | 2900 rpm |
| Operation | Automatic by LS |

Water Filter 12 m³/hour, 50 micron

| | |
|--------|-----------------|
| Type | Manual Backwash |
| Casing | Mild Steel |
| Media | Silica Sand |

Carbon Filter

| | |
|----------|-------------------------|
| Capacity | 12 m ³ /hour |
| Type | Manual Backwash |
| Casing | Mild Steel |
| Media | Carbon Active |

| | | | |
|-------------------|-----------------------|-------------------|--------------------------------------|
| Valve | 3. | Flange | :Ø 15 mm - Ø 40 mm – |
| Working Pressure: | 10 kg/cm ² | Screw End | |
| Material : | Ø 15 mm - Ø 40 mm – | | Ø 50 mm – Flanged |
| Brass/Bronze • | | Pipe | |
| | Ø 50 mm – Cast | -Working Pressure | :Clean Water – 10 kg/cm ² |
| Iron/Ductile Iron | | | Hot Water – 20 kg/cm ² |
| | | -Material | :Polypropylene (PP) |

| No. | Description | Elevation | | Note | Area | Occupancy Loads | Occupancy | Water loads | Clean water | Sewage water |
|-----|--|-----------|-----|------|-------|-----------------|-----------|-------------|-------------|--------------|
| | | m | | | | | | | | |
| | | | | | | | | | | |
| 1 | Basement floor | | | | | | | | | |
| | Ablution & room prayer | | | | 8.0 | 1.0 | 8 | 5.0 | 40.0 | 32.0 |
| | engineering office | | | | 10.0 | 10.0 | 1 | 50.0 | 50.0 | 40.0 |
| | security & cctv | | | | 18.0 | 10.0 | 2 | 50.0 | 90.0 | 72.0 |
| | laundry | | | | 17.0 | 10.0 | 2 | 50.0 | 85.0 | 68.0 |
| | | | | | | | | | | |
| 2 | Ground floor | | | | | | | | | |
| | bar area | | | | 30.0 | 10.0 | 3 | 50.0 | 150.0 | 120.0 |
| | FOH | | | | 18.0 | 10.0 | 2 | 50.0 | 90.0 | 72.0 |
| | manager room | | | | 12.0 | 10.0 | 1 | 50.0 | 60.0 | 48.0 |
| | Kitchen | | | | 78.0 | 10.0 | 8 | 50.0 | 390.0 | 312.0 |
| | | | | | | | | | | |
| 3 | Mezzanine floor | | | | | | | | | |
| | privat meeting | | | | 26.0 | 2.0 | 13 | 15.0 | 195.0 | 156.0 |
| | general management | | | | 73.0 | 10.0 | 7 | 50.0 | 365.0 | 292.0 |
| | staff canteen | | | | 34.0 | 10.0 | 3 | 50.0 | 170.0 | 136.0 |
| | prayer room | | | | 25.0 | 1.0 | 25 | 5.0 | 125.0 | 100.0 |
| | laundry area | | | | 196.0 | 10.0 | 20 | 50.0 | 980.0 | 784.0 |
| | | | | | | | | | | |
| 4 | 2nd floor | | | | | | | | | |
| | meeting room | | | | 254.0 | 2.0 | 127 | 15.0 | 1905.0 | 1524.0 |
| | prayer room | | | | 24.0 | 1.0 | 24 | 5.0 | 120.0 | 96.0 |
| | | | | | | | | | | |
| 5 | 3rd floor | | | | | | | | | |
| | meeting room | | | | 112.0 | 2.0 | 56 | 15.0 | 840.0 | 672.0 |
| | | | | | | | | | | |
| 6 | 4th floor | | | | | | | | | |
| | bed room | | | 17 | | 2.0 | 34 | 250.0 | 8500.0 | 6800.0 |
| | | | | | | | | | | |
| 7 | 5 th - 11th floor | | | | | | | | | |
| | bed room | | | 126 | | 2.0 | 252 | 250.0 | 63000.0 | 50400.0 |
| | | | | | | | | | | |
| 8 | 12th floor | | | | | | | | | |
| | bed room | | | 5 | | 2.0 | 10 | 250.0 | 2500.0 | 2000.0 |
| | | | | | | | | | | |
| | TOTAL | | | | | | 598 | | 79655.0 | 63724.0 |
| | | | | | | | | | | |
| 1 | fire fighting cap. 750 usgpm back up for 45 minute | | | | | | = | 127 | m3 | |
| 2 | clean water supply (Qd) | | | | | | = | 80 | m3 | |
| 3 | sewage water (Qd x80 %) | | | | | | = | 63.7 | m3 | |
| | | | | | | | | | | |
| | Main equipment | | | | | | | | | |
| | GWT | = | 207 | m3 | | | | | | |
| | STP | = | 64 | m3 | | | | | | |
| | | | | | | | | | | |

2.3 Hot Water System

Hot Water Demand

1. Hotel room hot water demand is calculated by one day daily peak hour demand.
2. Kitchen hot water demand is calculated from one day daily peak hour kitchen demand.
3. For hot water used a air to water heat pump.
4. Hot water system is equipped with a return pumps to keep the temperature constant

Hot Water Temperature

5. For guest room : 55 °C
6. For kitchen : 80 °C
7. Hot water is produced through heat pump.

2.4 Venting System

a. Venting system is formed from combination of single vent system, cup vent system and straight pipe vent system in one building.

b. Venting Material

- Pipes & Fitting : Polyvinyl chloride (PVC)
- Class : D (5 bar)

2.5 Rain Water System

All Rain water in this building is channeled to the main gutter and then flowed to infiltration wells.

1. Rain Water Intensity 78,3 mm/ Day
2. Maximum water flow rate 1,2 m/ sec anminimum 0,6 m/sec
3. Diameter of Infiltrationwell Ø 1500 mm Depth 3000 m
4. Slooping for Rain water.
 - a. Inside building slooping 1 %
 - b. Outside Building slooping 0,5%

3. SYSTEM DESCRIPTION

3.1 Clean water is gained from PDAM and back up form deep well.

3.2 Processed water will be stored at ground water tank, transfers to roof water tank and to be distributed to rooms by booster pumps.

3.3 Hot water velocity and pressure will be gained from cold water system.

3.4 Hot water will be produced from heat pump.

3.5 Sewage water from sanitary will be flowed and processed to sewage treatment plant (STP).

3.6 Waste water from kitchen sink will be collected in central grease trap.

3.7 Overflow from central grease trap will be flowed to STP.

4. SEWAGE TREATMENT INSTALLATION

4.1 a. Scope of Works

- Primary processing installation.
- Secondary processing installation.
- Tertiary processing installation.

4.2 Design Criteria

a. Proposed system is by using "Bio System" with following consideration:

- Waste types.
- Good effluent.
- Simple technology.
- Easy to maintenance.
- Reduced space demand.

b. STP Design:

- BOD₅ (Biological Oxygen Demand) & COD (Chemical Oxygen Demand)

- BOD₅ in=350mg/l= 0.350 kg/m³
- BOD₅ out= 20mg/l= 0.02 kg/m³
- COD in=600mg/l= 0.600 kg/m³
- COD out=50mg/l= 0.5 kg/m³

- TSS (Total Suspended Solid)

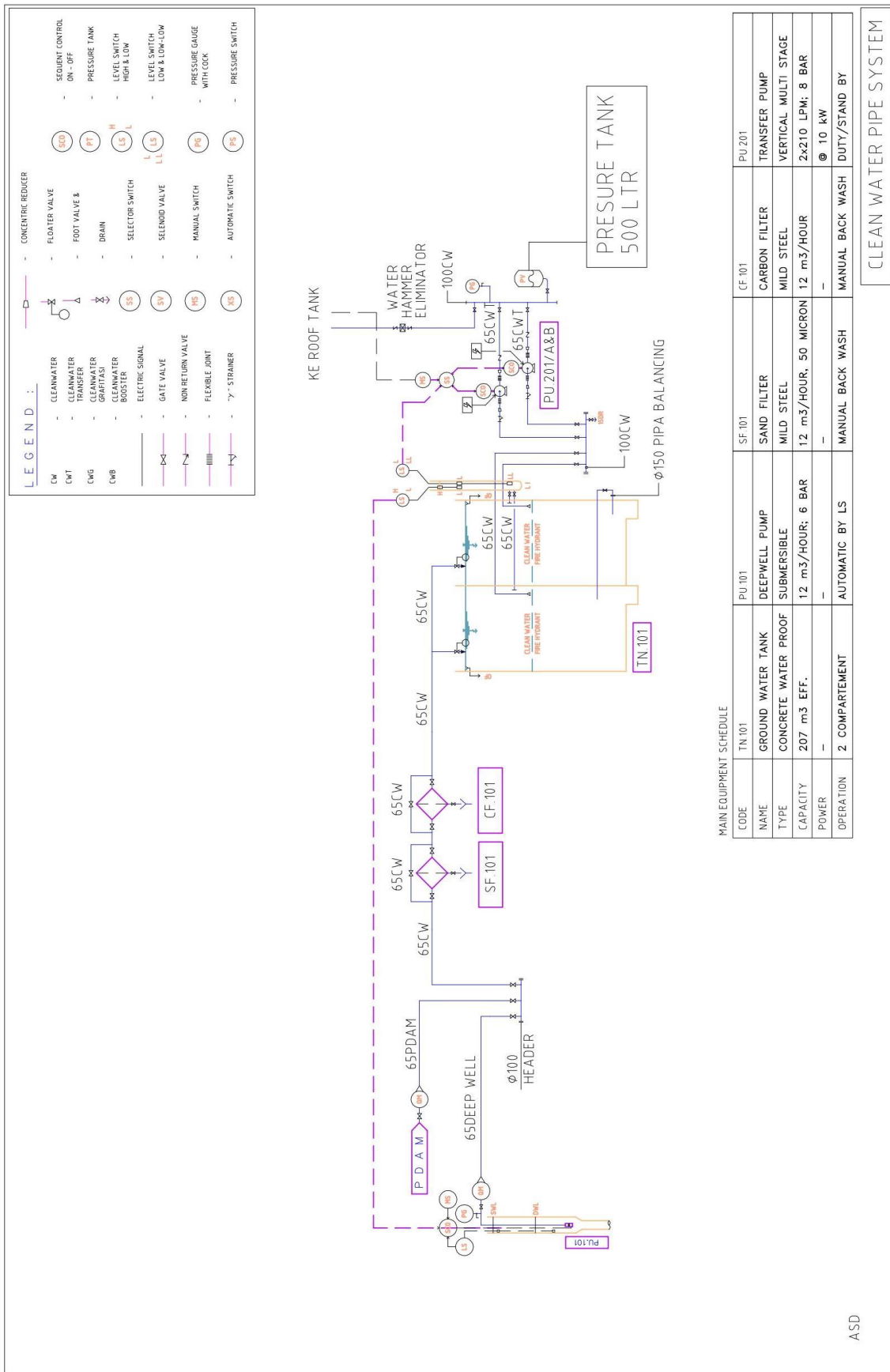
- TSS in=250mg/l= 0.250kg/m³
- TSS out=30mg/l= 0.030kg/m³

c. All output from kitchen sink will be centralized to central grease trap after take through individual grease trap.

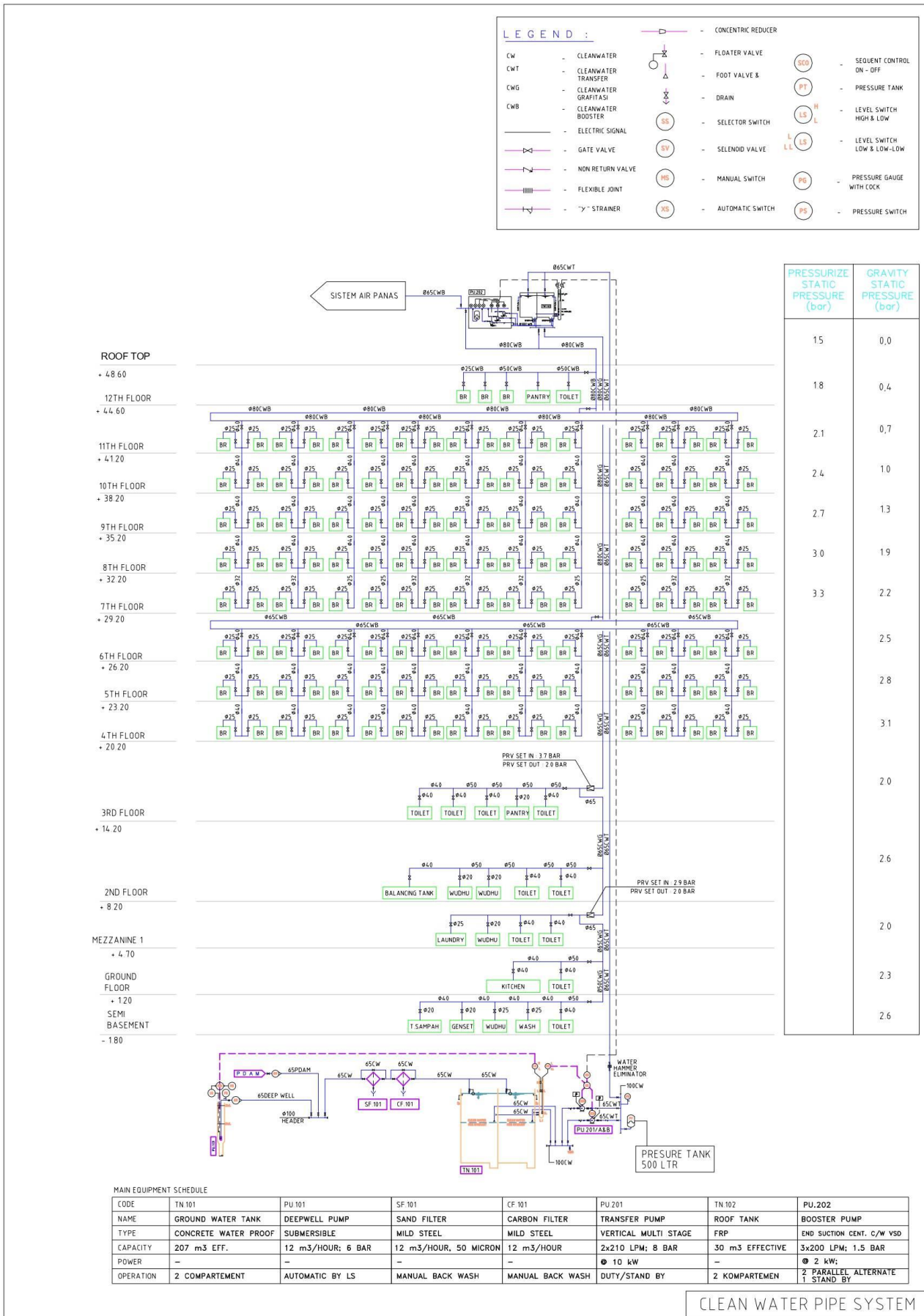
4.3 System Description

Proposed STP is by using "Extended / Bioreaktor" with capacity of 60 m³/day. In the process, oxygen is used to process organic waste to become harmless substances, thus can be put on municipal waste system.

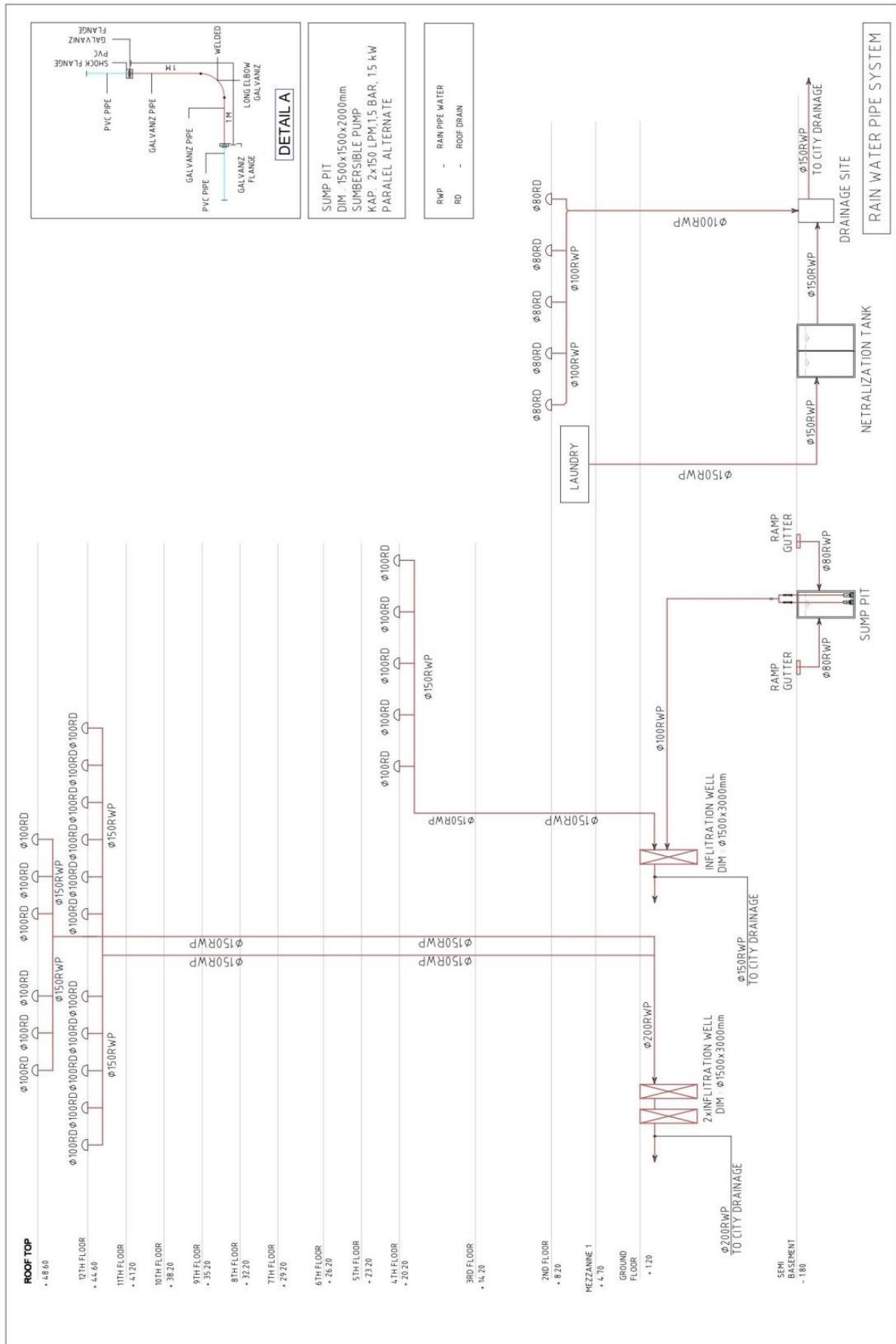
5. ATTACHMENT



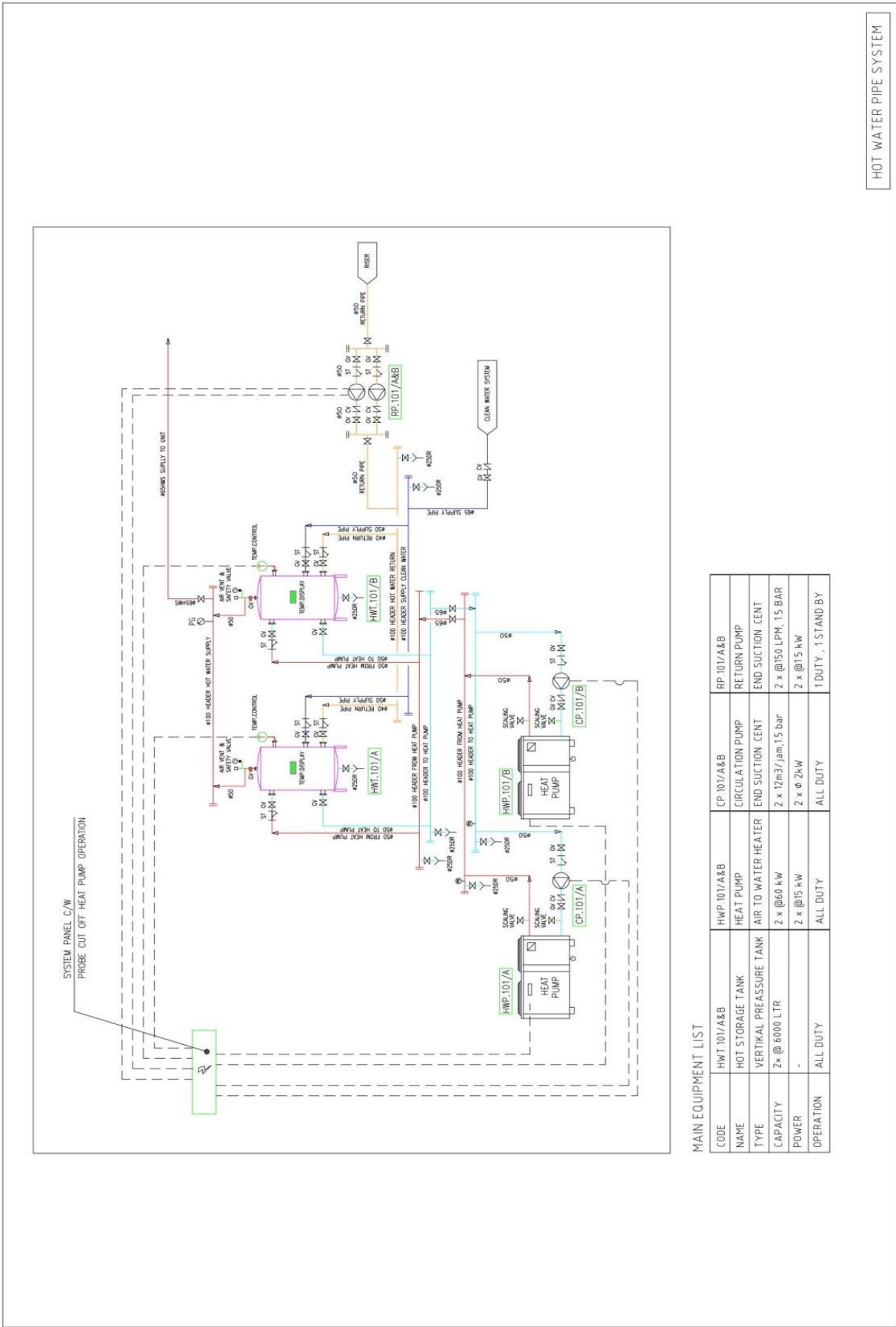
5.1 Diagram Schematic Clean water



5.2 Diagram Schematic sewage and waste water

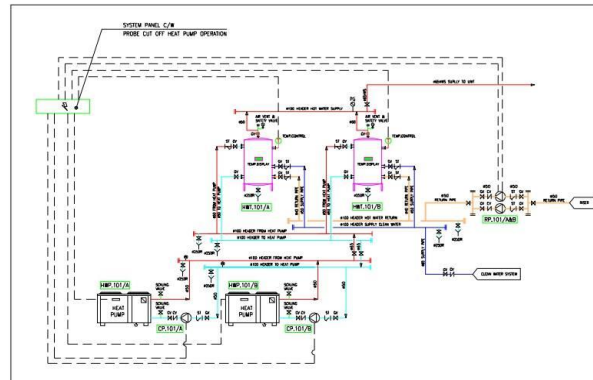


5.4 Diagram Schematic Head Pump

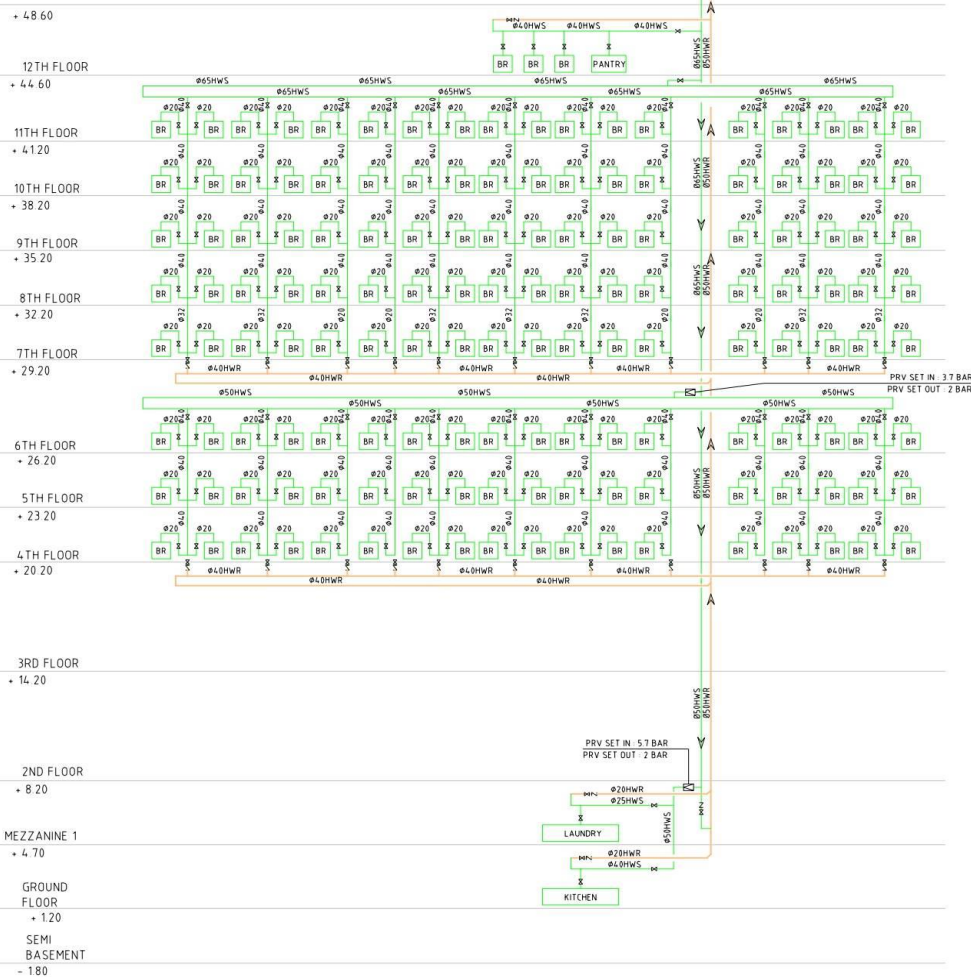


5.5 Diagram Schematic Hot Water

INSTALASI SYSTEM OF HEATPUMP BY SPESIALIST



ROOF TOP



| PRESSURIZE STATIC PRESSURE (bar) | PRESSURIZE REDUCER (bar) |
|---|--------------------------------|
| 15 | |
| 19 | |
| 2.2 | |
| 2.5 | |
| 2.8 | |
| 3.1 | |
| 3.4 | |
| 3.7 | 2.0 |
| 4.0 | 2.3 |
| 4.3 | 2.6 |
| 4.9 | |
| 5.5 | |
| 5.8 | 2.0 |
| 6.2 | 2.3 |

HOT WATER PIPE SYSTEM

REFERENCES

- Main water supply will be taken from Perusahaan Daerah Air Minum (PDAM – Local Water Company). With the capacity of 12 m³/hour.
 - Water quality will comply to clean water quality standard issued by the Ministry of Health (SK MENKES no. 16 MENKES/PER/IX/1990).
 - Clean water reservoir tank will be according to daily water usage estimated at 90 m³ (effective), concrete construction.
 - Water in-pipe flow velocity designed at 0.9 m/second – 1.2 m/second, with max velocity 1.5 m/second – 2 m/second.
 - Residual pressure on plumbing fixture 1 kg/cm².
 - Estimated water static pressure 2.5 kg/cm² - 3.5 kg/cm².
 - The Size of Clean Water Pipe is Determined Base On the load of the plumbing tools In Fixture Unit (FU)
 - Closet : 5 FU
 - Urinal : 5 FU
 - Lavatory : 2 FU
 - Sink : 4 FU
 - Water Trap : 1 FU
 - Shower : 2 FU
- (Source: SNI 03-7065-2005 page .17 and International Plumbing code 1995 page. 111)