

Packaged STP for Housing Complexes – Guidelines

Introduction

Packaged STP is sewage treatment facilities serving commercial / residential apartments / housing complex, hotel etc. where untreated sewage is not allowed to discharge into municipal sewer. It is suggested to reuse treated sewage for gardening, flushing, road washing, make up water for HVAC etc. For HVAC some additional treatment is required (demineralization / softener).

For recycling and reuse applications, it is contemplated that BOD/TSS less than 10 mg/L and Total coliform less than 230 MPN/100 ml in treated effluent.

Packaged STP can be installed above ground as well as below ground. Installation below ground need proper lighting, ventilation and RCC structure tanks. Generally, packaged plant can be of prefabricated MS with epoxy paint and mostly below ground will be of RCC structure.

The capacities will range from 10 KLD to 1000 KLD for packaged plants.

Typical treatment process for Packaged Plants:

- 1) Sequencing Batch Reactors (SBR)
- 2) Moving Bed Bioreactors (MBBR)
- 3) Rotating Biological Reactors (RBC)
- 4) Membrane Bioreactor (MBR)

Process flow diagram

The process flow sheet for treatment process is given in **Annexure-1**.

For Packaged STP, certain conditions must be fulfilled as follows:

1. The internal sewer line to be laid as per municipal specification and as per drainage By-laws.
2. To provide the vent shaft at the head chamber and sewer trap chamber as per drainage By-laws.
3. To submit the application for Completion Certificate for STP along with the completion plan after the work is completed.
4. The internal house drain should be laid as per drainage layout prepared by the licensed plumber as per guidelines issued by Municipal Corporation and copy of same shall be submitted to us at the time of applying for clearances.
5. The location of Sewage Treatment Plant should be got approved in the plans.
6. STP shall be well ventilated with force ventilation system and shall be maintained throughout the working of STP.
7. Proper precaution to be taken to avoid any leakage from STP to ensure that there is no contamination with drinking water.
8. The STP as proposed and constructed appears to be in order.

9. Test Results of the treated effluent shall be obtained periodically from the date of commissioning of STP. Reuse of the treated water shall be as per the Municipal Corporations norms only.

Typical unit process for Package STP

The STP shall be comprises of screening and biological aeration, dual media, pressure sand filtration and disinfection facility. The treated water can be used for gardening and flushing.

- a) Fine screens
- b) Oil and grease trap
- c) Equalization tank with mixing arrangement
- d) Aerobic biological reactor
- e) Secondary clarifier
- f) Filters (PFS followed by ACF)
- g) Disinfection (Hypo chloride and UV)
- h) Treated water tank with pumps
- i) Sludge collection tank with pumps
- j) Filter press / Basket type centrifuges

During rainy season, there will not be requirement for recycle water for gardens / parks, then arrangement for bypass of sewage from Packaged STP to Nearby public sewer shall be made by pumping system if gravity not permits.

Guideline for construction of Packaged STP

- Sufficient head room shall be maintained when STP installed below ground (in basement)
- Plant shall be preferably compact requiring small foot prints.
- Noise and Vibration shall be controlled.
- Operation and Maintenance skill staff shall be available for operation of STP.
- Aeration system shall be in operation continuously and mixing in equalization tank for odour free environment

Health and Safety Requirements

Following are the Health and Safety Requirements must be assessed to prevent from health hazards and avoidance of any risks:

- ✓ Providing acoustic to air blowers
- ✓ Forced ventilation system when plant is installed below ground
- ✓ Routine medical checkup of operators
- ✓ Exit signage boards
- ✓ Storage of chemicals in dry area
- ✓ Operating clearance between treatment units
- ✓ All staircase shall have handrailing

- ✓ Platform/walkway around treatment units with toe guard plate
- ✓ Adequate free board for various units
- ✓ Drainage system with sump and dewatering pumps.
- ✓ Provision of DG back up for STP
- ✓ Adequate standby units for blowers and pumps
- ✓ Alarm system for nonfunctional equipment, critical levels, etc.

Operation and Maintenance of the plant

The generally packaged STP need proper O&M for efficient operation.

- 1) Adequate opening / door width & height for installation of equipment and its replacement
- 2) Adequate passage for access to units.
- 3) Suitable tools and spare to be made available.
- 4) Chemical for atleast one-month storage to kept in store.
- 5) Availability of skilled O&M staff in shifts
- 6) Record of regular maintenance
- 7) Regular test of treated sewage parameters

Area required for Packaged Plant

Guideline on area required for setting up Packaged STP is given below:

Sl. No.	Treatment Process	STP Capacity (m ³ /day)	Min. Area required (sq. m.)
1	SBR (Sequencing batch reactor)	100	150
		500	600
		1000	1000
2	MBBR (Moving bed bioreactor)	100	200
		500	700
		1000	1200
3	RBC (Rotating Biological Reactor)	100	250
		500	800
		1000	1300
4	MBR (Membrane Bioreactor)	100	150
		500	500
		1000	800
5	SAFF (Submerged Aerobic Fixed Film)	100	150
		500	700
		1000	1200

Note: Area requirement may vary depends upon site, reuse requirement. During planning stage sufficient area shall be earmarked for Packaged STP as per Municipal Regulations.

Reference list of Vendors providing Packaged STPs

- 1) Thermax India Ltd.
- 2) Ion exchange India Ltd.
- 3) Hubert Envirocare Systems
- 4) Voltas Ltd.
- 5) GE Infrastructure (GE-Suez)
- 6) Integrated Envirotech Pvt. Ltd.
- 7) Grindwell Norton Ltd.
- 8) GET Water Solutions Pvt. Ltd.
- 9) Wock-Oliver Inc.
- 10) Amazon Enviro Tech Pvt. Ltd.

Annexure 1

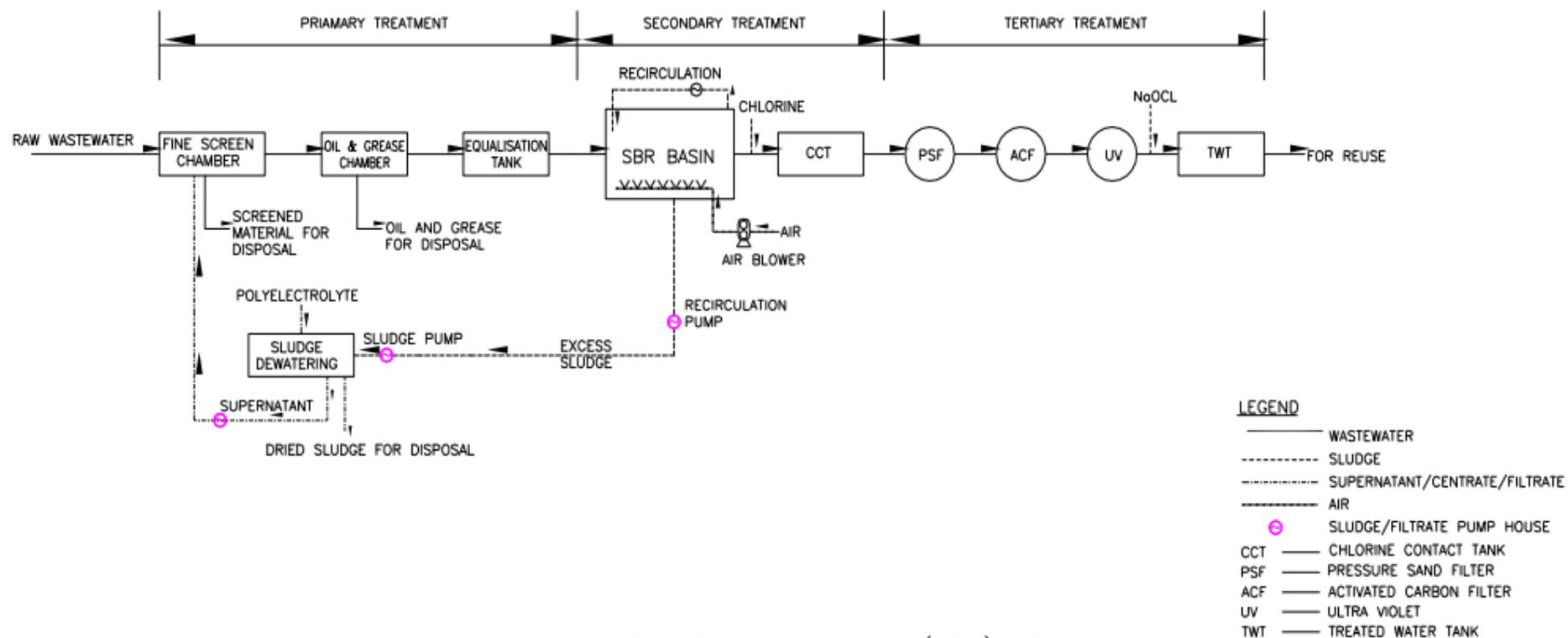


FIGURE 2: SEQUENTIAL BATCH REACTOR (SBR) PROCESS

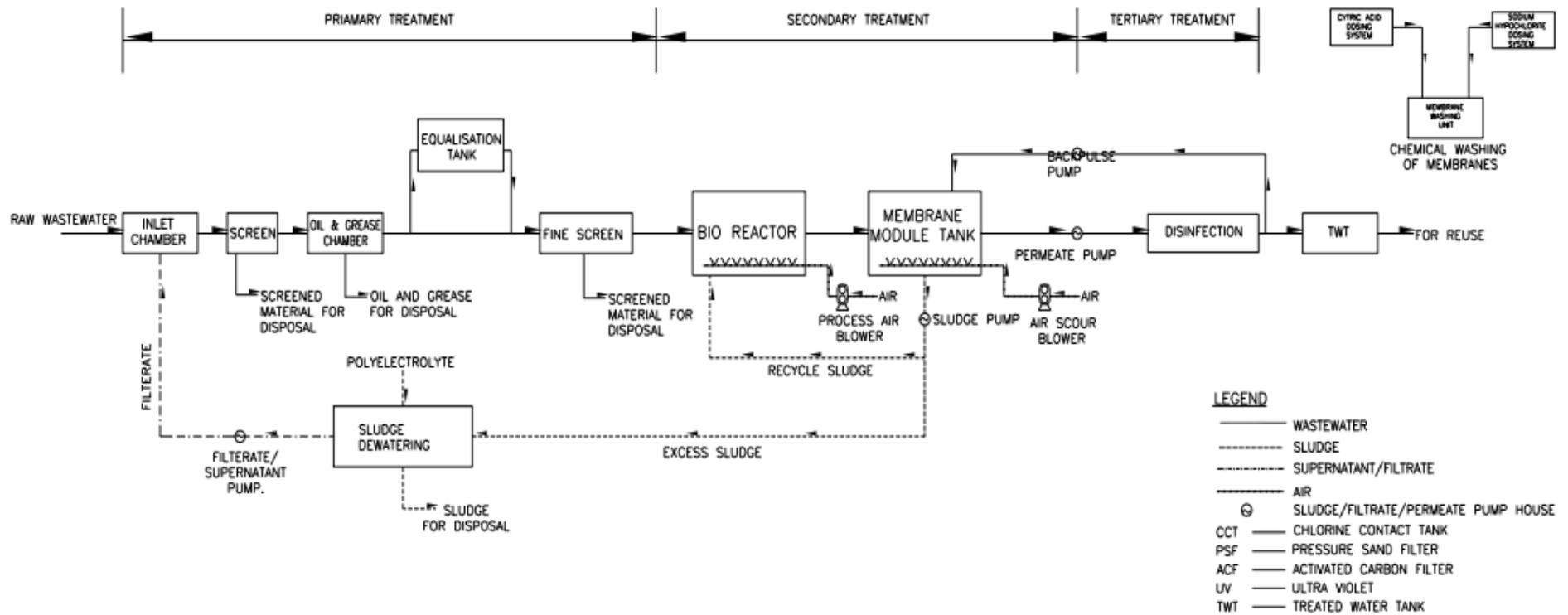


FIGURE 6 : MEMBRANE BIOREACTOR (MBR) PROCESS

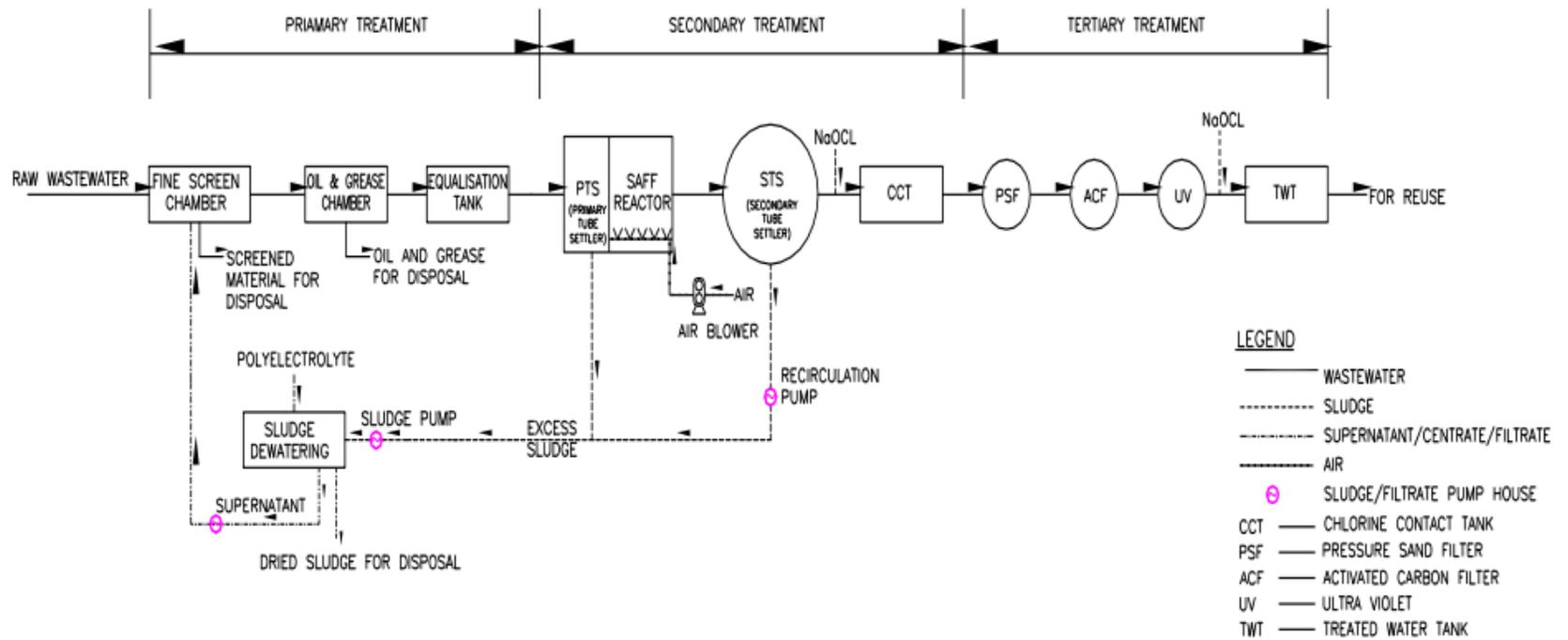


FIGURE 5: SUBMERGED AEROBIC FIXED FILM (SAFF) PROCESS

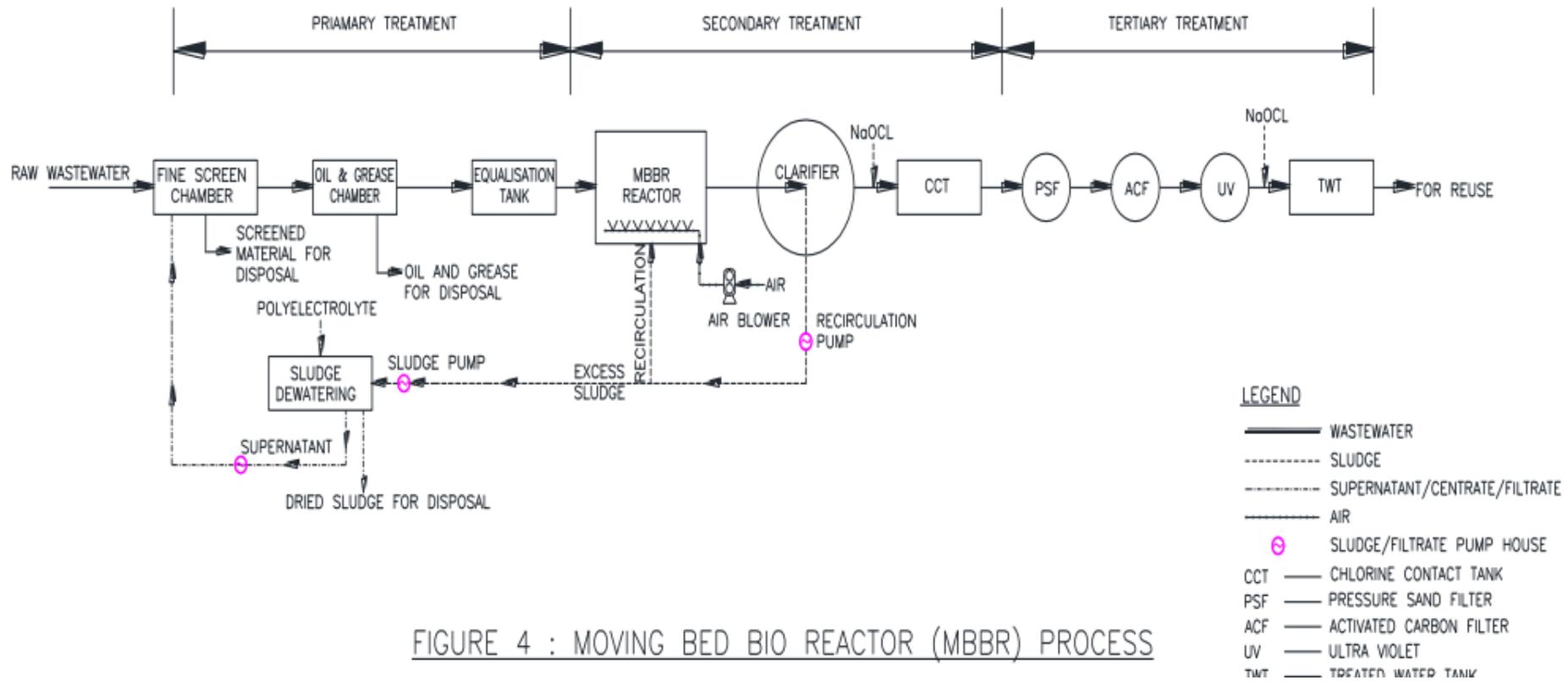


FIGURE 4 : MOVING BED BIO REACTOR (MBBR) PROCESS