University : KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES
Country : India
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[3] Waste (WS)

[3.17] Sewage Disposal (WS.6)

Karunya Institute of Technology and Sciences is committed to maintaining a healthy and sustainable campus environment through efficient sanitation and wastewater management practices. This document outlines the measures adopted for sewage disposal within the university, ensuring compliance with environmental and public health standards. By implementing effective sewage treatment and disposal systems, Karunya aims to prevent pollution, conserve water resources, and promote a clean and eco-friendly campus ecosystem.

Sewage Treatment Plant in KITS

Steps involved in treatment process

Primary, Secondary and Tertiary Unit Operations and Functions

Primary screening:

Screening essentially involves the removal of large non-biodegradable and floating solids that frequently enter the wastewater systems, these constitute of rags, paper, plastics, tins, containers, and wood.

Primary screening unit

Fluidised bed bio-reactor:

The sewage is brought into a biological aeration basin where
it is degraded by naturally occurring bacteria. After an "extended" period, typically 24 hours of detention time, the mixed liquor (ML) is sent to a clarifier, where it is allowed to settle Secondary effluent (SE) is drawn off the clarifier and the settled biomass is returned to the head of the plant.

Fluidized Bed Bio-Reactor

Settling tank:

In the settling tank, the sludge settles down in the hopper and is sent back to aeration tank to retain the biomass in the aeration tank

Settling Tank

Filtration system:

The filtration unit, that comprises of pressure sand filter and activated carbon filters, removes suspended matters such as flocs, micro-organisms, algae etc.

Filtration System

Sludge drying bed:

The generated sludge is allowed to dry by evaporation and excess water is drained over a period of several weeks depending on the climatic condition

Storage tanks for treated water (before reuse in the garden)

Reuse of the recycled/treated/new water from STP for gardening

Description:

SEWAGE TREATMENT PLANT (STP)

1. STP-Father Duraisamy Residence

Feed given to STP: Water from FDR, EGR & Hephzibah Hostels.

Capacity of the STP is	: 4, 00,000 LPD
Number of beds available to remove the sludge	: 12
Sludge removal from STP	: Once in 4 days
Number of beds filled	: 4

Bed dimensions	
Length of the bed	: 3.15m
Breadth of the bed	: 1.89m
Height of the bed	: 0.75m

Volume of 1 bed is given by = length × breadth × height
= 3.15 × 1.89 × 0.75
= 4.4651 Cubic meter

Volume of 4 beds = 4 × 4.4651
= 17.8605 Cubic meter

Water Treated daily
Water Recycled at Father Duraisamy Residence : 2, 40,000 LPD

Sludge Utilisation
Sludge is utilised in farming and gardening purposes and the details are given below

JMR & JVR – Backside (Fields)
SYNDICATE BANK, NEW AUDITORIUM- Garden
Hephzibah & Angelina Residence – Garden
Then fields extend up to SEMMEDU (outer).

1) STP-Bethesda

Capacity of the STP : 8,000 LPD
Purified water everyday : 4,000 LPD

This is only for water purification, so no sludge is produced from this.

2) STP- JMR

Capacity of the STP at JMR : 10, 00,000 LPD
Feed given to STP

1. Treated waste from a Biogas plant.
2. Some waste from Oil treatment plant.

Total no. of beds available to remove the sludge : 12
Sludge removal from STP : Once in 4 days
Number of beds filled : 4

Bed dimensions
Length of the bed : 2.70m
Breadth of the bed : 1.80m
Height of the bed : 0.60m
Volume of 1 bed is given by = length × breadth × height
= 2.70 × 1.80 × 0.60
= 2.916 Cubic meter

Total Volume in 4 beds = 4 × 2.916
= 11.664 Cubic meter

Water treated daily
Total water recycled at STP-JMR : 6, 00,000 LPD

3) STP-Ladies Hostels

Number of STPs in Ladies hostels are : 2

New Sewage Treatment Plant Capacity : 6, 00,000 LPD
Old Sewage Treatment Plant Capacity : 4, 50,000 LPD

Feed to STPs**:** Used water from all the ladies hostel and staff quarters.

Water recycled Daily
Water recycled in both STP is around : 5, 40,000 LPD

Sludge Utilisation
Sludge from the STPs is supplied to Karunya University Gardens and Bethesda gardens.