Saraswati 2.0

Identifying best available technologies for decentralized wastewater treatment and resource recovery for India

D2.6 Pilot 6 implementation report

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1 Context information and overview of the pilot

In Pilot 6, the proposed technology is based on an electroconductive filtering system. The pilot is coupled with an UASB reactor present in the IIT Kharagpur campus to offer full treatment. The downflow vertical type biofilter is constructed in two stages to provide passive aeration. For the safe reuse of treated water, after the electroconductive system a pressure sand filtration (suspended solids and turbidity removal) and a disinfection unit was implemented by means of UV and electrochemical treatment (electro-chlorination). The treated water is being reused for the onsite applications and for non-potable purposes such as horticulture, flushing etc.

Overview of the implementation area 1.1 – Pilot scale electrically conductive biofilter

2 Changes of the technology compared to the DOA

No changes has been made in the technology provided till now.

3 Detailed design and project report (task a)

The detail design should include the following points:

- Description of the technical solution adopted, including flow sheet/diagram, technological basis-including fundamentals, potential of resource/energy recovery, reuse, recycle, technical characteristics of the units, and any other technical information of interest)

3.1 Description of technology adopted:

This technology advances over the conventional wastewater treatment technologies because of the conductive media which assist in growth of electrogenic bacteria and also

result in enhanced degradation rates and nutrient removal. Replacement of inert media of bio-filter with electrically conductive media integrate the concept of microbial electrochemical technologies into bio-filters, which improves the pollutant removal efficiency. In such systems, electro active microorganisms oxidize the organic matter and, generate electrons, which are transferred to the electrically conductive media that acts as an electron sink. This is unlike anaerobic digestion, in which the availability of terminal electron acceptors (TEAs) in wastewater can be a rate limiting step. The continual electron acceptance in electrically conductive bio-filter causes a reduction in available electron for methane production. This prevents the built up of unutilized electrons within the bio-filter. Thus enhances the degradation of organic matter and nitrogen removal. The intermittent ventillation will provide the conducive atmosphere for the growth nitrifiers which assist in nitrification.

3.2 Potential of resource/energy recovery, reuse, recycle

The reuse of the final effluent for non-potable such as horticulture, gardening, flushing etc. Concerning the energy demand, the electroconductive system shall work without energy supply (except pumping, if required

4 Detailed engineering design and construction (task b)

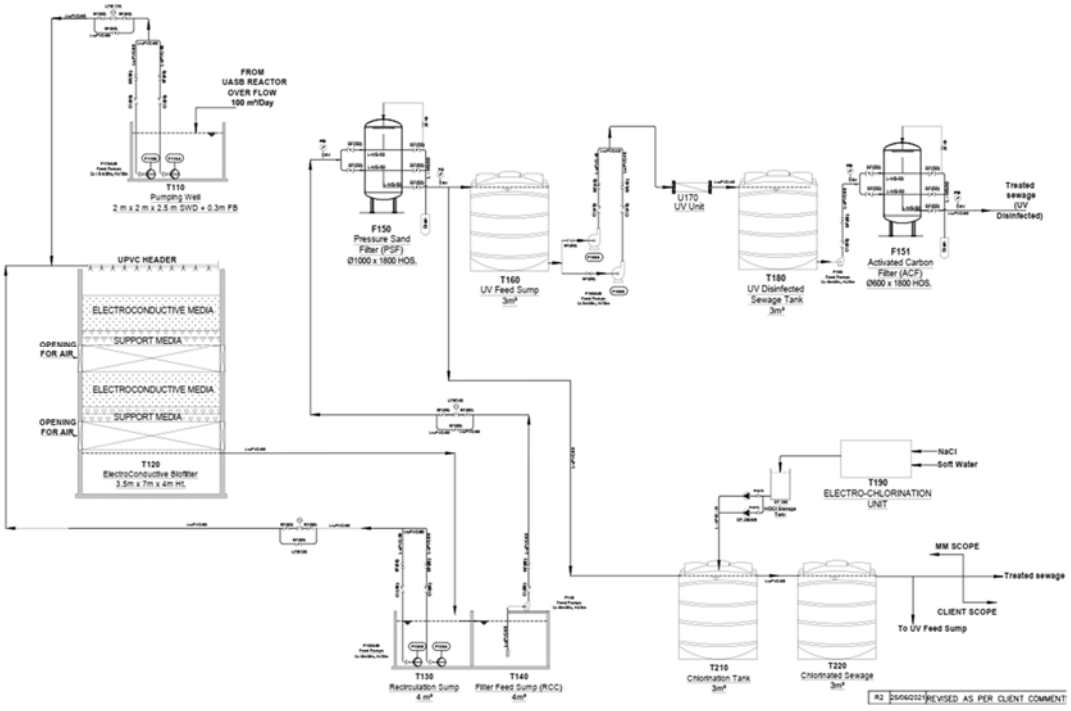

Figure 1.4.a. PID diagram

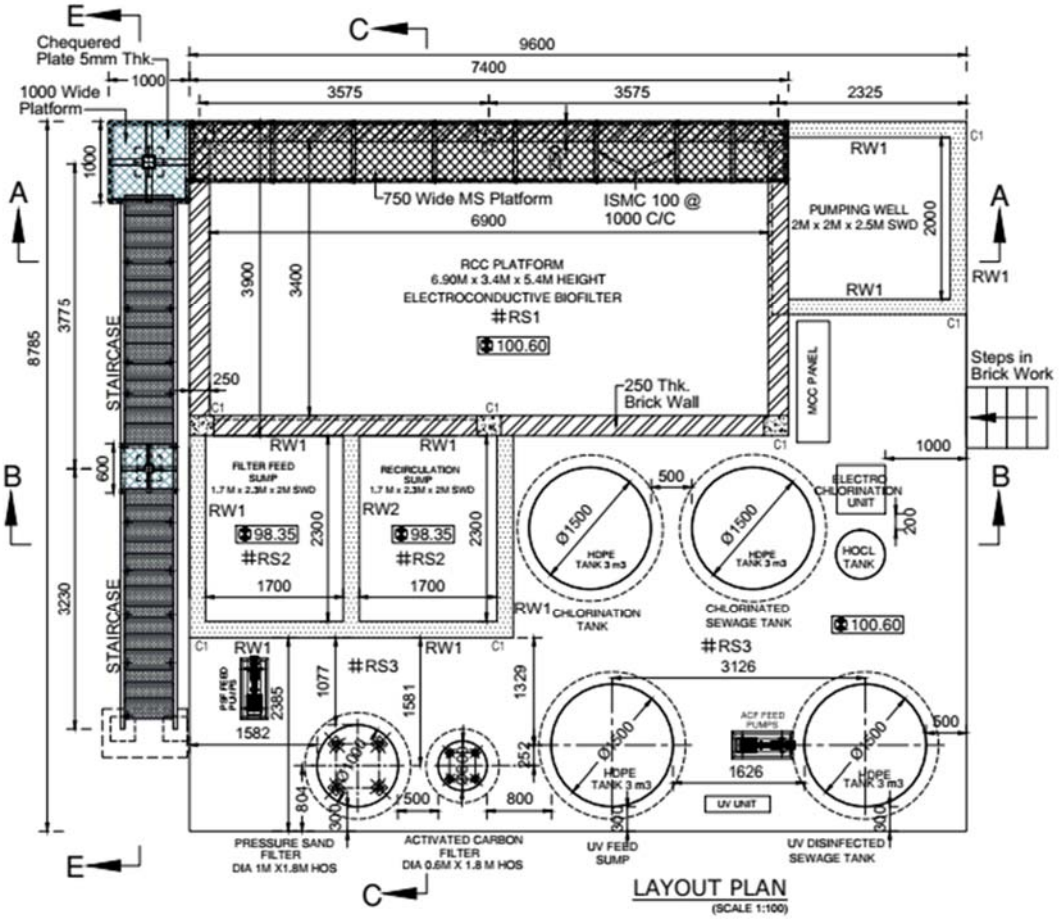

Figure 1.4.b. Layout

5 Commissioning and start of operation (task c)

The pilot was commissioned on 1-Oct-2022 operation started on 8-Oct-2021.

Figure 1.5 Commissioned pilot