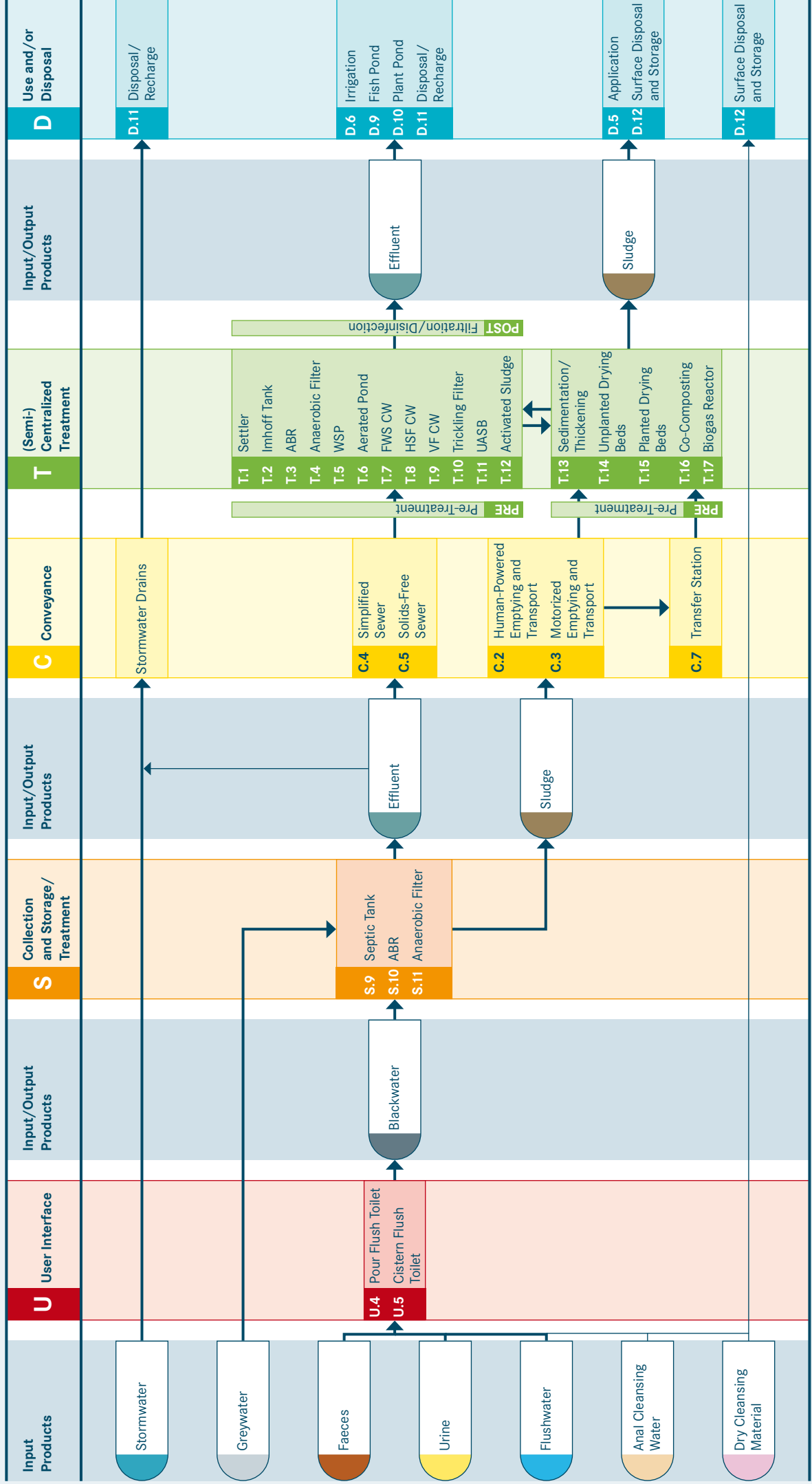
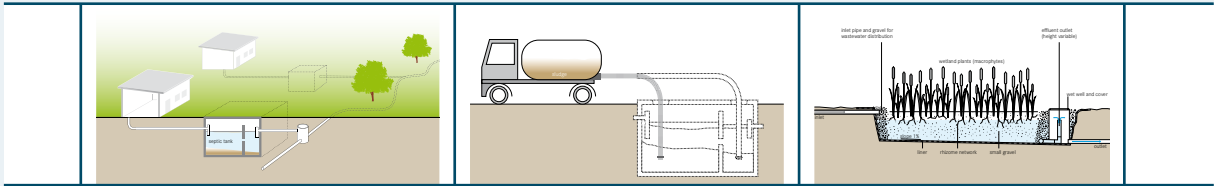


Sanitation System 7: Blackwater Treatment System with Effluent Transport



System 7: Blackwater Treatment System with Effluent Transport



This system is characterized by the use of a household-level technology to remove and digest settleable solids from the Blackwater, and a Simplified (C.4) or Solids-Free (C.5) Sewer system to transport the Effluent to a (Semi-) Centralized Treatment facility. Inputs to the system can include Faeces, Urine, Flushwater, Anal Cleansing Water, Dry Cleansing Materials and Greywater.

This system is comparable to System 6 (Blackwater Treatment System with Infiltration) except that the management of the Effluent generated during Collection and Storage/Treatment of the Blackwater is different: the Effluent from Septic Tanks (S.9), Anaerobic Baffled Reactors (S.10) or Anaerobic Filters (S.11) is transported to a (Semi-) Centralized Treatment facility via a Simplified or a Solids-Free Sewer. The Collection and Storage/Treatment units serve as “interceptor tanks” and allow for the use of simplified small-diameter sewers, as the Effluent is free from settleable solids. Similar to System 6, the Effluent can also alternatively be discharged into the Stormwater drainage network for Water Disposal/Groundwater Recharge (D.11), although this is not the recommended approach. This should only be considered if the quality of the Effluent is high and transportation to a treatment plant is not feasible.

Effluent transported to a treatment facility is treated using a combination of the technologies T.1-T.12. As in System 6, the Sludge from the Collection and Storage/Treatment technology must be removed and transported for further treatment in a dedicated Sludge treatment facility (T.13-T.17).

A technology selection tree for Sludge treatment plants is provided in Strande et al., 2014 (see Sector Development Tools, p. 9). (Semi-) Centralized Treatment technologies (T.1-T.17) produce both Effluent and Sludge, which may require further treatment prior to Use and/or Disposal.

Options for the Use and/or Disposal of the treated Effluent include Irrigation (D.6), Fish Ponds (D.9), Floating Plant Ponds (D.10) or discharge to a water body (Water Disposal/Groundwater Recharge, D.11). After adequate treatment, Sludge can either be used in agriculture (D.5) or brought to a Storage/Disposal site (D.12).

Considerations This system is especially appropriate for urban settlements where the soil is not suitable for the infiltration of Effluent. Since the sewer network is shallow and (ideally) watertight, it is also applicable for areas with high groundwater tables. This system can be used as a way of upgrading existing, under-performing Collection and Storage/Treatment technologies (e.g., Septic Tanks) by providing improved treatment.

The success of this system depends on high user commitment concerning the operation and maintenance of the sewer network. A person or organization can be made responsible on behalf of the users. There must be an affordable and systematic method for desludging the interceptors since one user’s improperly maintained tank could adversely impact the entire sewer network. Also important is a well-functioning and properly maintained treatment facility. In some cases this will be managed at the municipal or regional level. In the case of a more local, small-scale solution (e.g., constructed wetlands), operation and maintenance responsibilities could also be organized on the community level.

This water-based system is suitable for Anal Cleansing Water inputs, and, since the solids are settled and digested onsite, easily degradable Dry Cleansing Materials can be used. However, rigid or non-degradable materials (e.g., leaves, rags) could clog the system and cause problems with emptying and, therefore, should not be used. In cases when Dry Cleansing Materials are separately collected from the flush toilets, they should be disposed of in an appropriate way (e.g., Surface Disposal, D.12).

With the offsite transport of the Effluent to a (Semi-) Centralized Treatment facility, the capital investment for this system is considerable. Installation of an onsite Collection and Storage/Treatment technology may be costly, but the design and installation of a Simplified or Solids-Free Sewer will be considerably less expensive than a Conventional Gravity Sewer network. The offsite treatment plant itself is also an important cost factor, particularly, if there is no pre-existing facility to which the sewer can be connected.

Guidelines for the safe use of Effluent and Sludge have been published by the World Health Organization (WHO) and are referenced on the relevant technology information sheets.