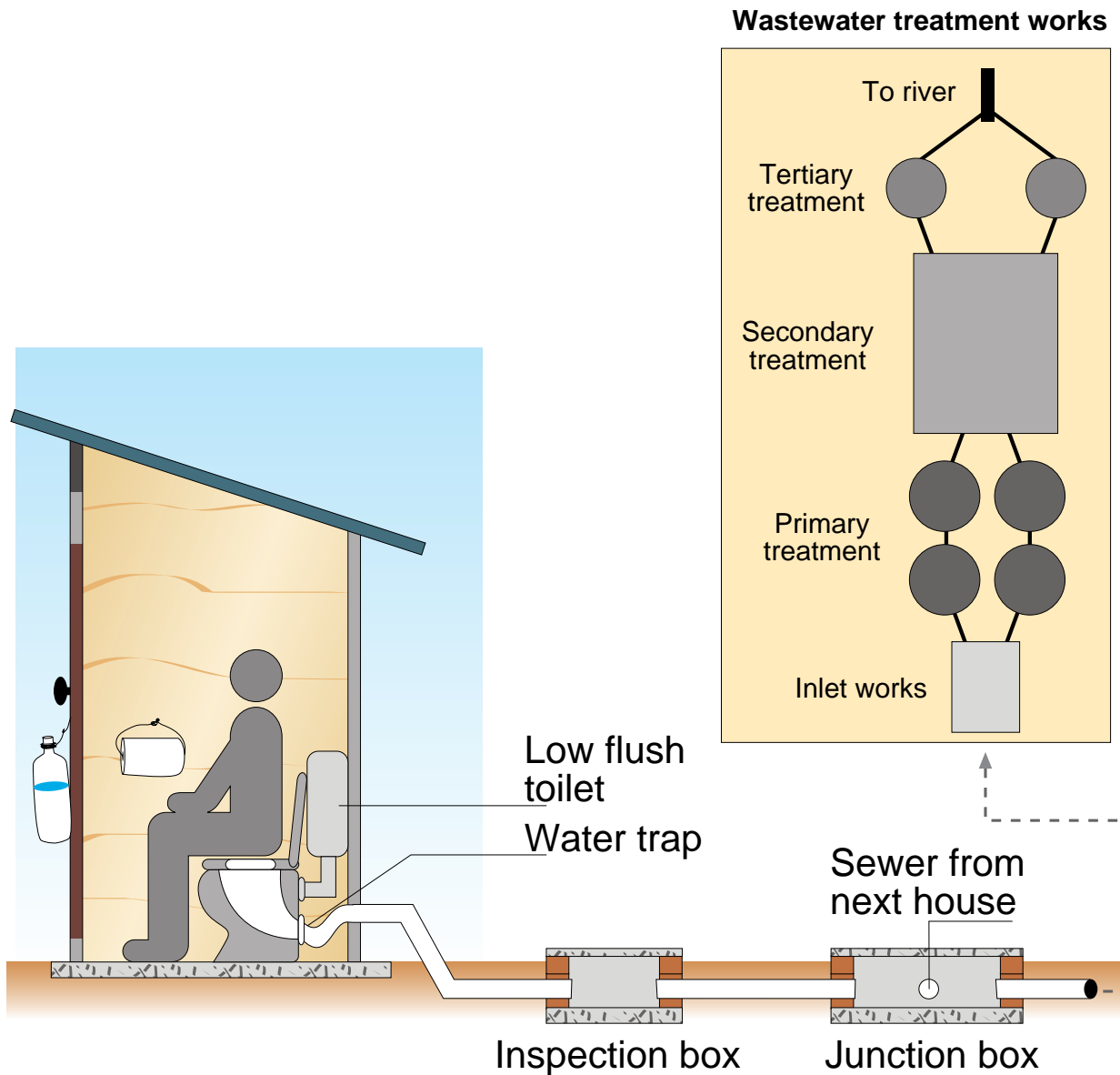


Shallow sewerage



A toilet, usually in-house, flushed using lower volumes of water than either conventional sewerage or septic tanks, to smaller diameter sewers laid at flatter gradients and shallower depths between dwellings on a block. On-site shallow inspection chambers are provided.

Principles of operation	Operational and institutional requirements	Costs	Experience and comment
Waste from the toilet and possibly domestic wastewater, but at much lower volumes than for conventional sewerage, is flushed into the on-site sewerage system and progressively washed down to either a dedicated treatment facility or into street sewers and then on to a major treatment works.	Requires reliable household availability of water and high levels of connection into the sewerage system are necessary. Can, however, be laid out in less formal and spatially irregular settlements. Less stringent design criteria - but organised and effective operation and maintenance capability is required. This can be delegated to residents for on-site sewers. Significant user education and acceptance of shared management of the system is critical.	Capital: R 2500 to R 3000 - savings of up to 50% over conventional sewerage capital costs. Operational: R300 - R450 assuming that all maintenance is provided by the service provider. Drops to R312 where residents are responsible for operation and maintenance of block (not bulk) sewers.	Have not been used widely in South Africa although used, with reported success, under a wide range of conditions in a number of South American countries, Ghana, Pakistan and Greece. Pilot projects have been completed in Durban and Free State, with ongoing monitoring to determine overall success and sustainability. These indicate savings of up to 50% over conventional sewerage capital costs.