Disposal of sullage and drainage

Why is it important to dispose of sullage ?

Sullage is the used water resulting from washing clothes and kitchen utensils, shower or bath water and other domestic water not containing excreta. Sullage can have a lot of germs in it and so is dangerous for children who may play in it or even drink it. The quantity of sullage varies with the quantity of water supplied and certain local practices, such as whether personal and clothes washing is done at the home or at the water source.

Sullage often collects in pools which then make good breeding places for flies or mosquitoes which may spread yellow fever and dengue fever. Some types of germs, such as cholera, can also grow and multiply in sullage pools and become a major risk to public health. Mixed sullage contains significant amounts of organic material and when this decays it may result in unpleasant smells.

Although sullage is not a primary contributor in the spread of cholera, it can help the spread of other diseases and should be disposed of carefully. Where water-flushed sanitation does not exist, domestic sullage should be disposed of separately from excreta. Any pools or areas where sullage collects should be kept dry by building permanent drainage and filling in any holes with earth or sand.

Disposal of sullage

Sullage from the house can be disposed of in several ways :

- It can be used for watering garden crops, provided a suitable sized plot is available and the soil is sufficiently permeable. This method is particularly important in dry areas where sullage may be the only water available for small scale irrigation.

- Allow the sullage to flow into a septic tank if this is already built. Take care to fit water seals on sullage drains to stop any odours from the septic tank passing up the sullage drain and into the house.

- Construct a soakaway pit which allows sullage to soak into the ground (see Figure 1). This type of pit only works in absorbent soils such as sandy soil. Where soil contains a lot of clay, water will not seep into the ground and the pit will quickly fill up and overflow. Add a splash plate to prevent cavitation or boring, as well as to distribute the flow.

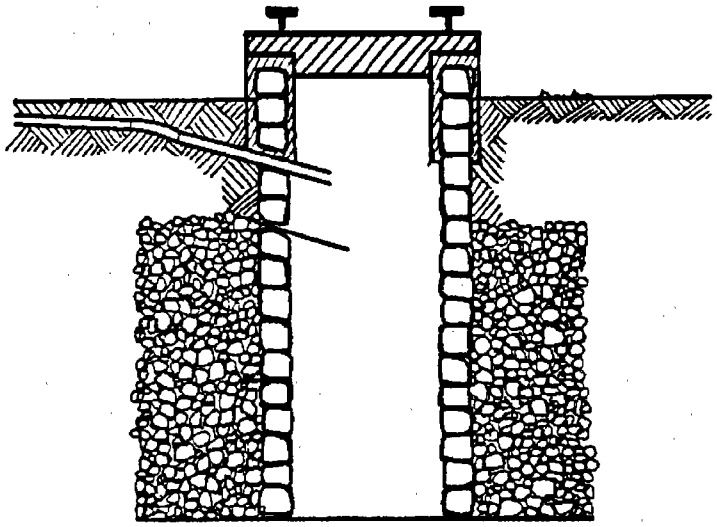

Figure 1. Soakaway pit

- Where the soil contains a lot of clay, sullage from a single household can be allowed to flow over the soil around crops, which helps to absorb the water. It is important to let the water flow over as large an area as possible by digging irrigation channels to stop the sullage forming in pools. This method does not usually work well in urban areas where many houses are producing sullage in a small area. In the wet season, when the soil is saturated, this method is not recommended.

- In urban areas where many people live close together, it may be best to lay a piped drainage system, such as small bore or conventional sewerage, to remove both sullage and effluent from toilets and septic tanks. Fact Sheet 3.10 describes lagoons and other forms of sewage treatment methods.

- Sullage may be discharged into stormwater drains. Careful hydraulic design is necessary if both sullage and stormwater are to be disposed of in the same drain, to prevent solids in the sullage being deposited in the drain and causing an obstruction to the flow. This can create ponds of sullage which will encourage the breeding of flies and mosquitoes. A minimum gradient of 1 :150 should be used to ensure adequate flow. The best solution is to construct the drain with a small channel on the floor of the drain to carry sullage. This removes sullage more efficiently than a simple large channel (see Figure 2). Open or covered drains may be used ; these should either be concrete lined or open jointed pipes which should be inspected and cleared regularly.

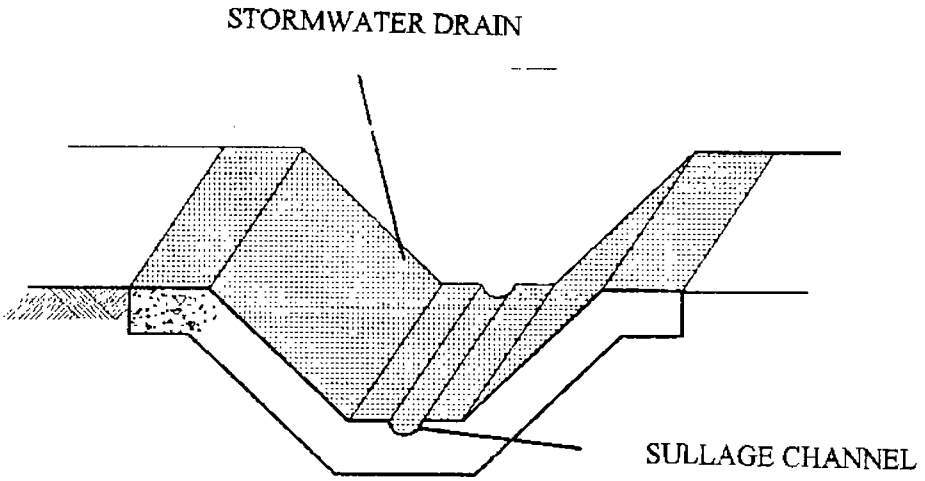

Figure 2. Storm drain with sullage channel

Drainage

Good drainage is important to the health of communities because it prevents the breeding of flies in stagnant pools and it removes flood water. The removal of flood water is particularly important in low-lying urban areas. If there is inadequate drainage, pit latrines and other sanitation facilities can overflow during floods. There is also a risk that flood waters can contaminate drinking water supplies, burst pipelines and cause sewers to backflow or break. These situations present a major health risk, as excreta will be present in surface waters. Cholera epidemics are very common after natural disasters, such as major floods, when water supplies and sanitation services have broken down. Whilst drainage may not prevent all such events occurring, good drainage will reduce their severity and frequency, and is an essential component of disaster prevention infrastructure.

Poor drainage at communal sites, such as standposts and washing areas, can lead to unpleasant and insanitary conditions. If there are areas in a community where sullage or rain water collects regularly, then drains can be dug to make sure that these areas stay dry. Open or closed drains can be used to carry the water to an infiltration site, such as a soakpit or drainfield. Drains should be laid at a minimum gradient of 1 :150 to ensure that no solids are deposited on the drain floor. A silt trap can be built at the infiltration site to remove any suspended solids. Drains should be inspected regularly and any debris blocking the drain removed.

There are numerous ways of installing a drainage system, from lined open drains to buried open jointed pipe drains. The latter are shown in Figure 3.

Figure 3. Drain using open jointed pipes

It is important to be sure, when laying drains, that the soil at the soakpit or drainfield is permeable enough to absorb the water. If it is not permeable enough, another site should be found. To assess the permeability and so the suitability of the soil, the following procedure should be followed :

- *Bore at least six holes of 10 centimetres diameter and 50 centimetres deep over the area proposed.*
- *Add about 5 centimetres of gravel to the bottom of each hole (to protect the bottom).*
- *Fill all the holes with water and leave overnight (to allow the soil to become saturated).*
- *Refill the holes with water to about 15 centimetres above the gravel.*
- *Measure the fall in water in centimetres after 30 minutes.*
- *Calculate the percolation rate as follows :*

$$\text{Percolation rate} = \frac{\text{Water level drop X 60 cm/h}}{30}$$

If the percolation rate is 15 mm/h or more, then it is usually considered that the soil has sufficient percolative capacity for a pour flush latrine, seepage pit or drainfield to be constructed. When the soil has a percolation rate of below 15 mm/h, then excreta disposal options which do not require seepage pits or drainfields should be sought.