



## 5. Biological Filter System

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A biological filter system (BFS; Figure 5.1) relies on microorganisms, worms and beetles to break up the organic material in wastewater. They convert the organic material into humus and maintain drainage and air porosity.

A BFS generally consists of several layers of organisms on a finely structured humus, coco-peat and geotextile fabric. Aerobic processes occur in the system that produce very little or no odour. The mechanical components generally consist of a single-phase industrial strength pump and a small air pump. Effluent is commonly treated to close to a secondary standard. These systems generally do not include disinfection, so they can only be irrigated via subsoil irrigation (300 millimetres depth) or disposed of to absorption systems (a NSW Health requirement). These systems require some maintenance that varies with the different system types.

This Section can also be used for wet composting systems (dry composting systems are discussed in Section 6 of this Manual).

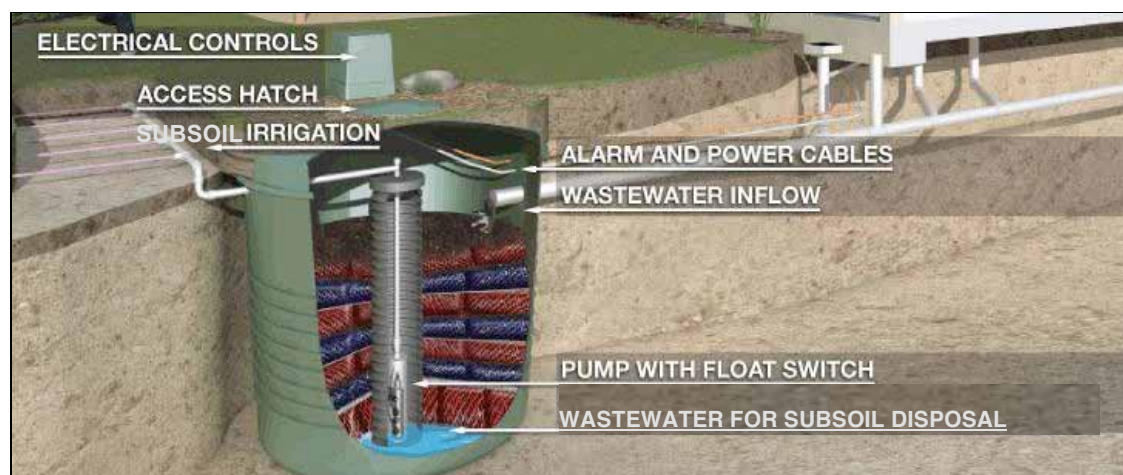


Figure 5.1 A Biological Filter System (after Biolytix, 2009)

### 5.1 Design

#### System selection

Any domestic BFS installed in NSW must be accredited by NSW Health (see the NSW Health website [www.health.nsw.gov.au/publichealth/environment/water/waste\\_water.asp](http://www.health.nsw.gov.au/publichealth/environment/water/waste_water.asp)). A regulatory authority cannot approve the installation of a non-accredited system.





### Step 5 Connecting pipes and fittings

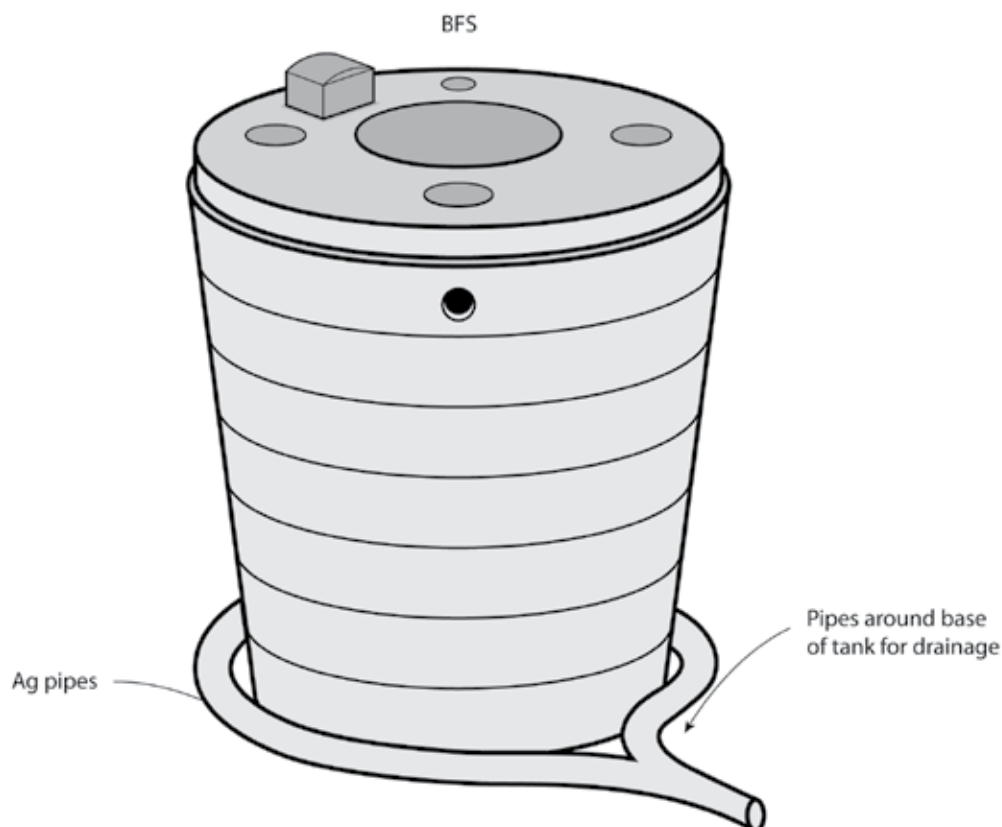
Connect the tank inlet to the inlet pipe using a 100 millimetre rubber sleeve and secure it according to plumbing practices detailed in AS/NZS 3500:2003 and the manufacturer's recommendations. Methods to secure pipe work into inlets and outlets vary with the different tanks, which may include concrete, fibreglass or polyethylene.

### Step 6 Sealing pipes and lids

Seal tank lids and inlet and outlet connections with an appropriate durable and flexible sealant.

### Step 7 Drainage

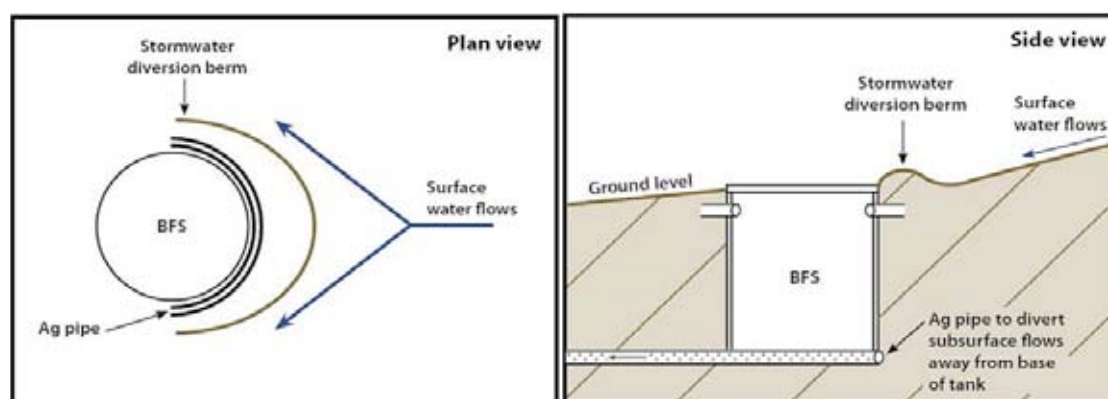
If stormwater or groundwater cannot adequately drain away from the tank hole, the tank could move resulting in failed or broken pipes and connections and/or the tank lifting completely out of the ground. Infiltrated stormwater and/or groundwater should be drained from around the tank using agricultural (Ag) pipe (Figure 5.3) and a free draining backfill. If this is not possible because there is not enough fall for the water to exit the pipes, the tank may need to be anchored (Step 8).



**Figure 5.3 Ag pipes around base of tank for drainage**

Sloping sites and sites with high surface water flows may need stormwater diversion devices to prevent ponding and pooling around the top of the installed tank. A surface drainage berm to divert surface water run off from pooling around the tank can be constructed using mounded soil before vegetating (see Figure 5.4).

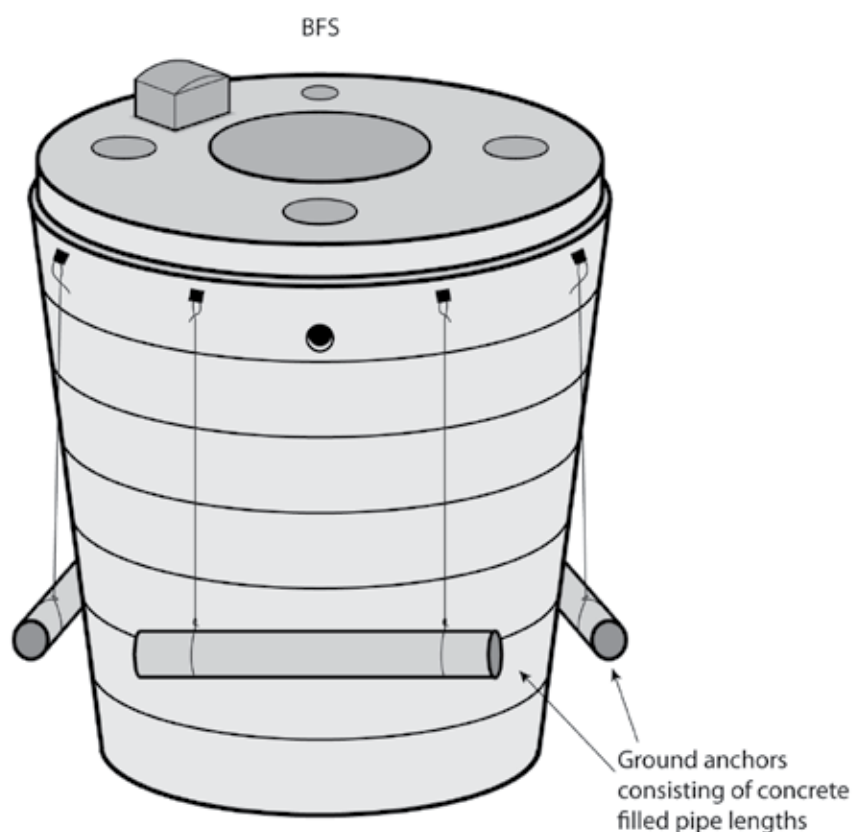
It is also important to ensure that the tank lid is adequately sealed and protrudes at least 100 millimetres from final ground level to prevent stormwater inundation and flooding of the tank.



**Figure 5.4 Tank stormwater drainage design**

### Step 8 Attaching ground anchors

Where tanks are made from polyethylene or fibreglass, there is high groundwater on the site, or drainage cannot be installed, ground anchors will need to be attached (Figure 5.5). If they are needed, the size and installation of ground anchors must comply with 'AS/NZS 1546:2008 3.2.2 Anchorage'.



**Figure 5.5 Ground anchors**

When the tank is installed, loops must be fitted to connect the anchors to the tank. Each side of the tank must be anchored using a piece of filled pipe attached to the tank by durable ties made from stainless steel cable. These ties are fitted to the anchor points on the tank and have a loop in the other end at excavation base level. Backfilling covers the anchors and secures the tank in the ground. To prepare ground anchors you must:





















