Information sheet on Soakaways in accordance with BRE Digest 365

CONSTRUCTION DETAILS

Maintenance of soakaways has always presented problems, usually in finding them! This is certainly the case with rubble-filled ones. All soakaways should be provided with some form of inspection access, so that the point of discharge of the drain to the soakaway can be seen. This access will identify the location and will allow any material to be cleared from the soakaway.

Little monitoring of soakaway performance is done, but this could be most informative about changes in soil infiltration rate and in warning of soakaway blockage in the long term. The inspection access should provide a clear view to the base of the soakaway, even when the soakaway is of the filled type (fig 3). For small, filled soakaways, a 225mm perforated pipe provides a suitable inspection well. Lined soakaways have the advantage of access for inspection and cleaning and this should be a feature of all soakaways. Trench-type soakaways should have at least two inspection access points, one at each end of a straight trench, with a horizontal perforated or porous distributor pipe linking the ends along the top of the granular fill (Fig 4). It may be convenient with a trench soakaway to have several drain discharge points along the length of the trench, each connected to the soakaway via an inspection access chamber.

In trench soakaways, the movement of suspended and floating material into the distributor pipe can be minimised by using wet wells with a T-piece inlet fitted to the distributor pipe (fig 5). Two or more T-piece inlets to distributor pipes in two or more trench soakaways may be appropriate for large wet well designs. The advantages of sedimentation of fine material in the pre-cast chamber, for ease of maintenance and extended operating life, are combined with the more efficient trench discharge characteristics.

Perforated, pre-cast concrete ring unit soakaways should be installed within a square pit, with sides about twice the selected ring unit diameter. The need to oversize the soakaway pit for purposes of constructing the ring unit chamber may be used to advantage by incorporating the total excavation volume below the discharge drain invert in the design storage volume.

Granular material must be separated from the surrounding soil by a suitable geotextile to prevent migration of fines into the soakaway. If migration from the surrounding soil occurs, it can cause ground settlement around the soakaway sufficient to affect the stability of adjacent buildings. The top surface of the granular fill should also be covered with geotextile to prevent the ingress of black fill material during and after surface reinstatement. Geotextile should not be wrapped around the outside of the ring units. This is because it can't be cleaned satisfactorily or removed when it has been blocked.

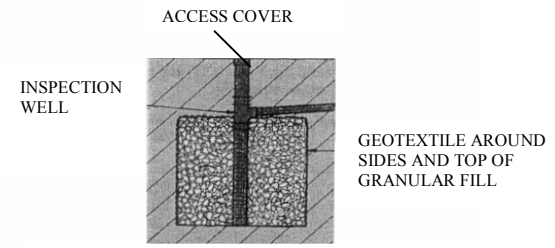

Fig 3 Small, filled soakaway with perforated inspection well to base of soakaway providing access to discharge drain outlet.

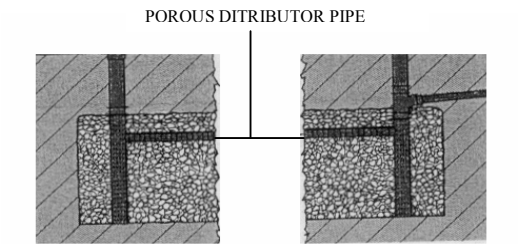

Fig 4 Trench-type soakaway with horizontal distributor pipe

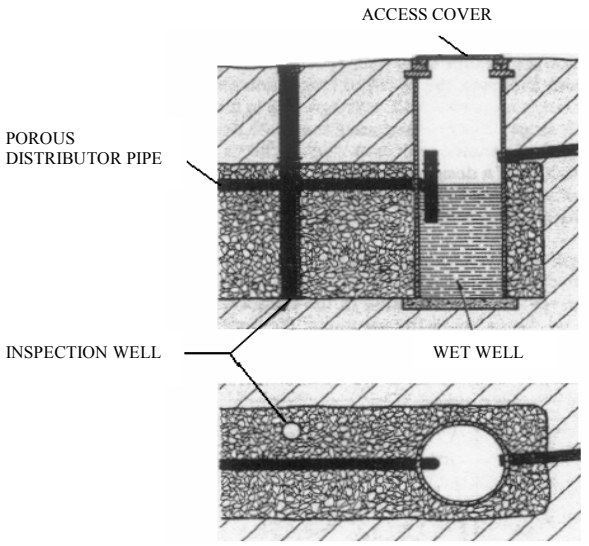

Fig 5 Trench-type soakaway with large wet well equipped with T-piece overflow to porous distributor pipe and separate inspection well

GENERAL CONSIDERATIONS

Soakaways can provide a long-term, effective method of disposal of storm water from impermeable areas of several hundreds of square metres. Long-term maintenance and inspection must be considered during the design and construction process. With wet well soakaways, vehicle mounted suction emptying and jetting equipment can be used, so suitable access to inspection covers must be provided.

Pollution danger to the quality of groundwater must be considered. The limited evidence presently available suggests that roof surface run-off does not cause damage to groundwater quality and may be discharged directly to soakaways. Those pollutants entering the soakaway from roofs tend to remain in the soakaway, or in its immediate environs, attached to soil particles. However, paved surface run-off should be passed through a suitable form of oil interception device prior to discharge to soakaways. Maintenance of silt traps, gully pots and interceptors will improve the long-term performance, and the use of wet well chambers within the soakaway system can further assist in pollutant trapping and extended operating life.

Care must be taken so that the introduction of large volumes of surface run-off into the soil does not disrupt the existing sub-surface drainage patterns; it may be advantageous to use extended trench soakaway systems. The effect of ground slope must be considered when siting soakaways to avoid water logging of downhill areas.

Soakaways should not normally be constructed closer than 5m to building foundations. In chalk, or other soil and fill material subject to modification or instability, the advice of a specialist geotechnologist should be sought as to the advisability and siting of a soakaway.

Site investigations must be undertaken thoroughly and competently so that all aspects of soil properties, geotechnology and hydrogeology are adequately reviewed alongside the hydraulic designs of soakaways.

How to conduct and collect data for the soil infiltration rate.

The method of determination must give representative results for the proposed site of the soakaway. This is achieved by:

- Excavating a trial pit of sufficient size to represent a section of the design soakaway. (See additional information below for trial pit sizes.)

- Filling the pit three times in quick succession whilst monitoring the rate of seepage, to represent soil moisture conditions typical of the site when the soakaway becomes operative.

- Examining site data to ensure that variations in soil conditions, areas of filled land, preferential underground seepage routes, variations in the level of groundwater, and any geotechnical and geological factors likely to affect the long-term percolation and stability of the area surrounding the soakaway have been assessed.

- Groundwater should not rise to the level of the base of the soakaway, during annual variations in the water table.

Additional Information.

The soakaway trial pit size will be subject to the type of works being carried out.

For 'New Dwellings and Commercial / Industrial buildings' the trial pit size is required to be:

- Excavated to the same depth of the anticipated full size soakaway below the invert of the drain.

- The trial pit should be 0.3 to 1m wide and 1 to 3m long.

- It should have vertical sides trimmed square and, if necessary for stability, should be filled with granular material.

- When there is no granular material needed, it is advised to place two pegs into the trial pit at the 75% level and the 25% level. This allows the water level readings to taken accurately.

- The trial pit should be filled, and allowed to drain three times to near empty, with readings taken as follows:
    - The time in which the water level took to lower to 75% full
    - The time in which the water level took to lower to 25% full

- When granular material is used, a full-height, perforated, vertical observation tube should be positioned in the pit so that water level's can be monitored with a dip tape.

- The trial pit is filled on three occasions to give a true reading on the ground conditions. Therefore the soil infiltration rate will be taken as the worst of these three readings.

It should be possible to construct a suitably dimensioned pit with a backhoe loader or mini-excavator.
A lot of water will be used to determine the soil infiltration rate so a water bowser may be needed. The inflow should be rapid so that the pit can be filled full in a short time. (Care should be taken during inflow to prevent the pit walls from collapsing.)

For 'Extensions to Dwellings' the trial pit size is required to be:

- Excavated to a size, of 300mm^2, and to a depth, of 300mm below the anticipated invert of the drain.

- With narrow short pits being harder to trim and clean prior to testing, the pit should be measured before trials, to ensure the correct dimensions.

- It is advised to place two pegs into the trial pit at the 75% level and the 25% level. This allows the water level readings to taken accurately.

- The trial pit should be filled, and allowed to drain three times to near empty, with readings taken as follows:
    - The time in which the water level took to lower to 75% full
    - The time in which the water level took to lower to 25% full

- The trial pit is filled on three occasions to give a true reading on the ground conditions. Therefore the soil infiltration rate will be taken as the worst of these three readings.

Attached to this information pack is a copy of the Soil Infiltration Rate check sheet.
This sheet should be used to record the necessary data when carrying out the Soil Infiltration Rate tests.
This copy must be returned to Building Control after completion of the test.

Building Regulations No.

CHECK SHEET

Please fill in the relevant information below and return both copies to Building Control as soon as possible.

1. Please specify the size of the soakaway that you are proposing to use:

   Width (m) _____ **Length (m)** _____ **Depth (m)** _____

2. Please specify the area that is to be drained to the soakaway: _____ **m^2**

3. Please specify the size of the trial pit:

   Width (m) _____ **Length (m)** _____ **Depth (m)** _____

4. Please specify the proposed invert level of the drain: _____ **m**

5. Below is a table for you to input the data (times) gathered from the Soil Infiltration Rate tests:

Test Number	75%	25%	25% - 75%
1			
2			
3			

Key:

75% - The time taken in minutes for the water level to fall to 75% full.

25% - The time taken in minutes for the water level to fall to 25% full.

25% - 75% - The 25% time minus the 75% time. (This will give the time for the water level to fall from 75% full to 25% full.)

Name: **Signature:** **Date:**