Unit 209: Drainage systems

Outcome 1 (part 2)

The requirements of drainage systems

Types of systems

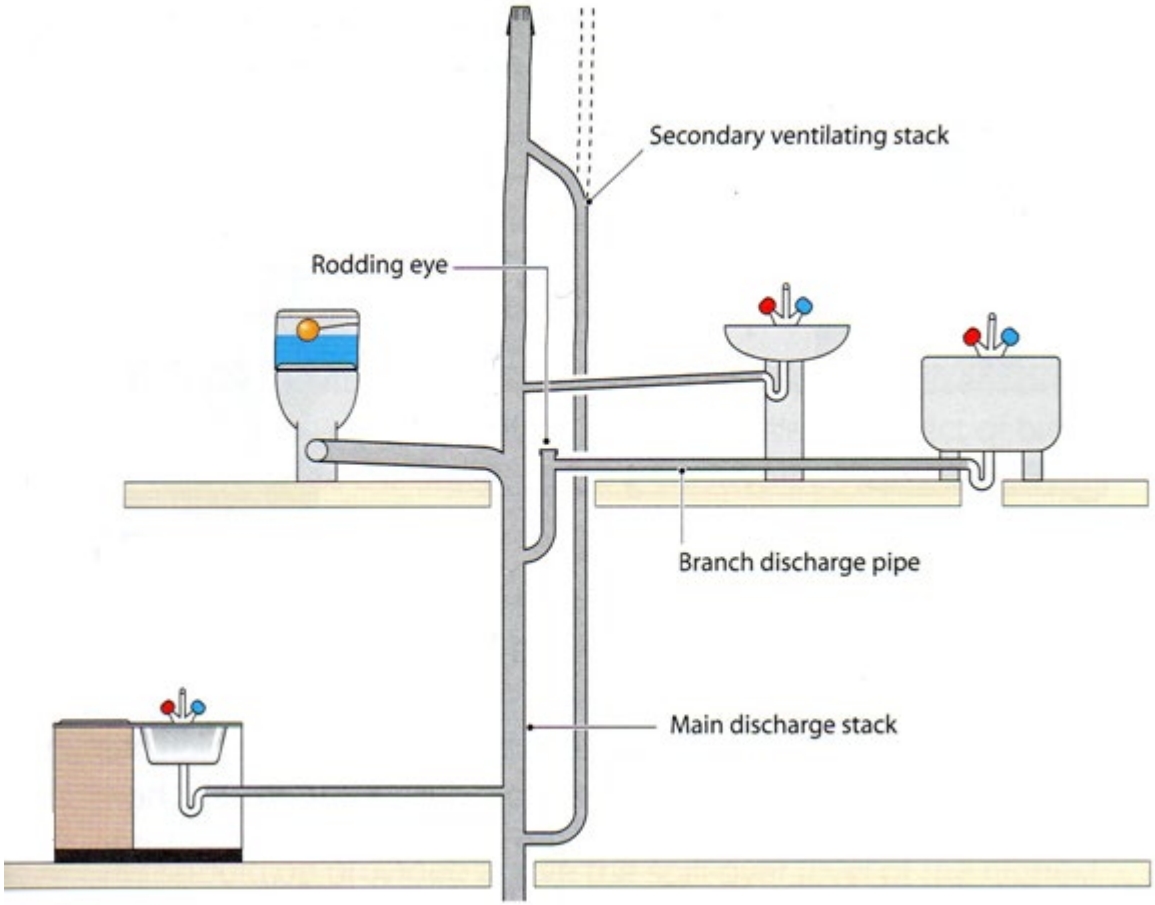
Secondary ventilated stack

With this system, the main stack has a secondary vent, which is connected from just above the long radius bend going up to the dry section of the stack.

This secondary vent allows additional airflow and safeguards against any positive or negative pressure fluctuations.

Types of systems

Secondary ventilated stack



Types of systems

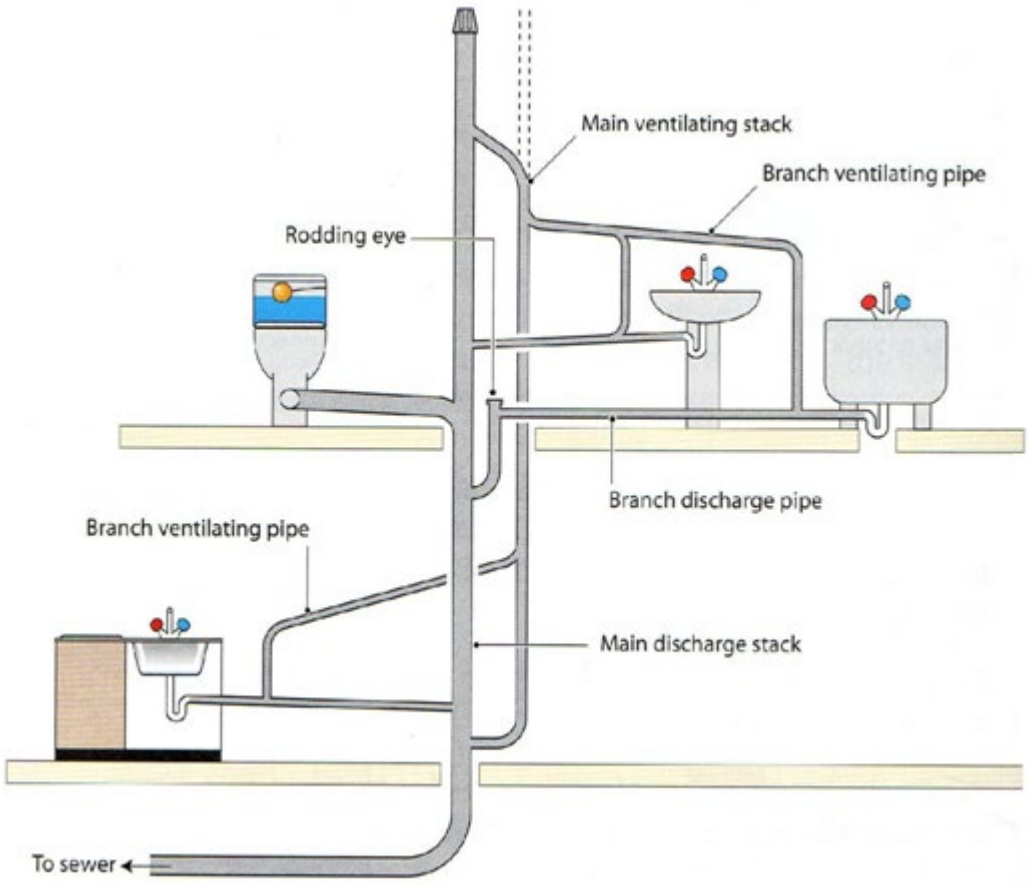
Ventilated branch system

This tends to only be used in larger systems where the risk of trap seal loss is high (public buildings, hotels, hospitals etc).

Each branch is ventilated no more than 750mm from the appliance. This allows additional airflow, not only in the main stack but also in each discharge branch, which safeguards against any positive or negative pressure fluctuations.

Types of systems

Ventilated branch system



Types of systems

Ventilated branch system

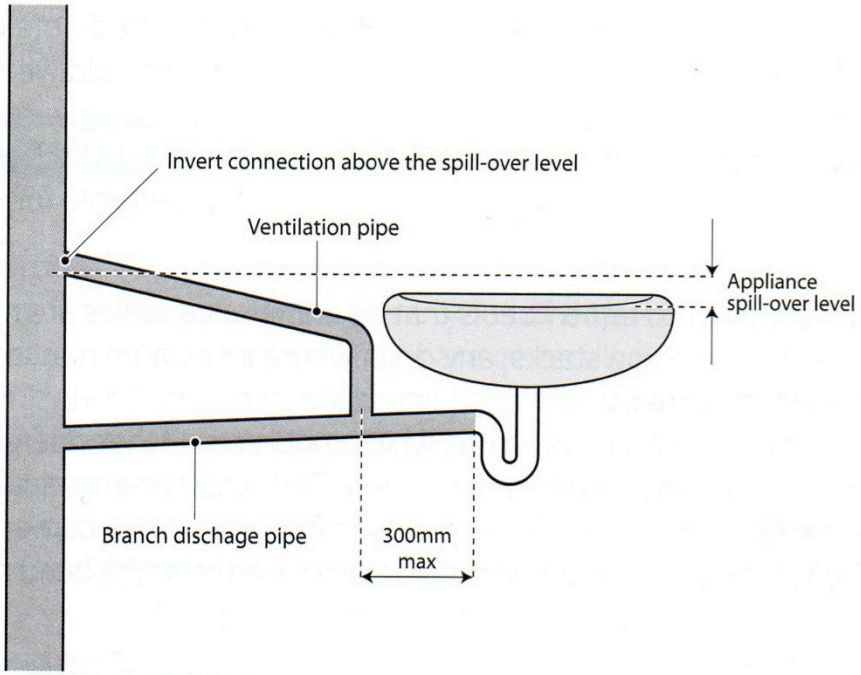
As shown in the illustration on the previous slide, the discharge branches migrate downwards allowing the effluent to discharge, while the branch ventilating pipes migrate upwards so no effluent can enter the vent system.

The size of the branch ventilating pipe for a single appliance is a minimum of 25mm – for multiple appliances it is 32mm.

Types of systems

Ventilated branch system

Any branch ventilating pipe must be connected to the discharge stack above the spillover level of the appliance.



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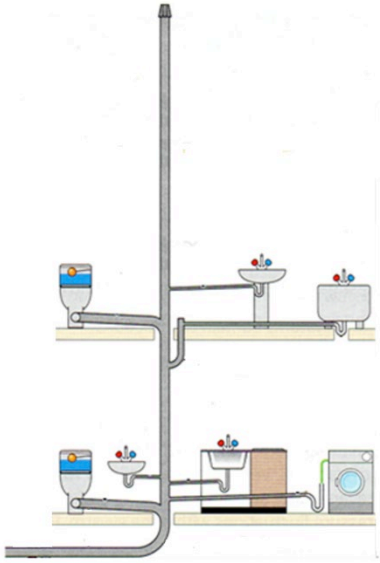
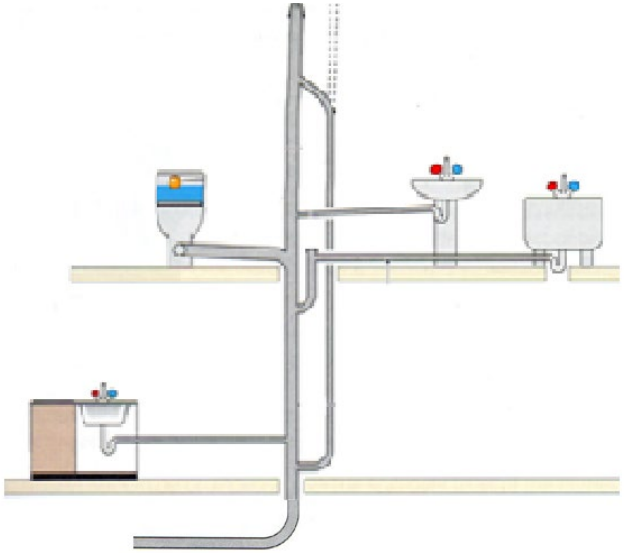
Types of systems

Types of systems

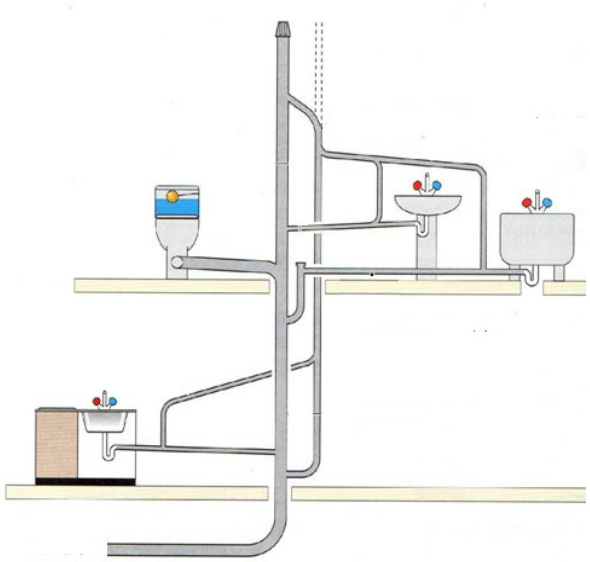
Primary ventilated system



Secondary ventilated system



Ventilated discharge branch system



Types of systems

Termination

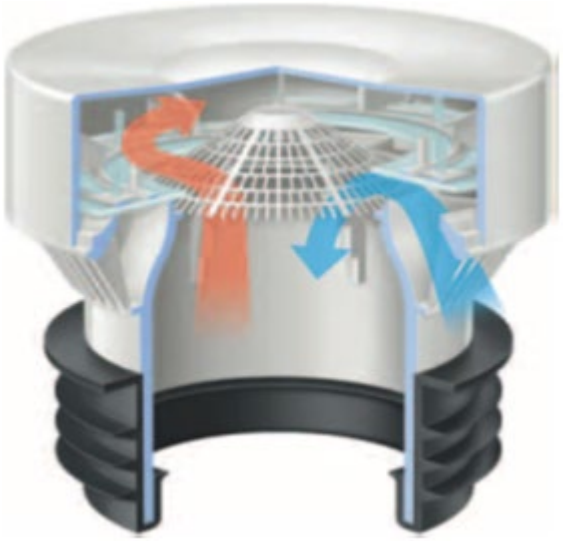
A soil stack can either terminate inside the loft area or ducting within the property, or it can terminate outside the property to atmosphere.

In either case, no foul smell should be allowed to penetrate the property.

Types of systems

Termination

According to Building Regulations the acceptable way to terminate a soil stack inside a building is by installing an air admittance valve. This allows air in if the pressure fluctuates, but it does not allow foul air out.

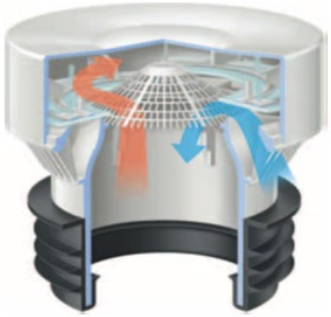


Types of systems

Termination

The main purpose of an air admittance valve is to allow air into the stack but **not** to allow the foul air into the building. The AAV is sometimes situated inside boxing. If this is the case there must be:

- Access available for maintenance
- Sufficient ventilation in the boxing for the AAV



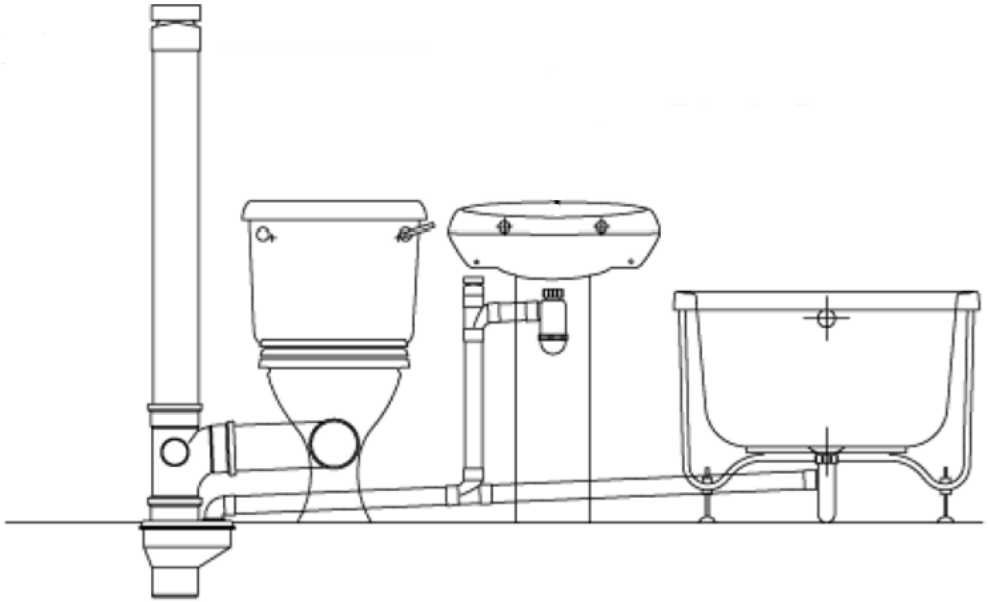
Types of systems

Termination

When installing an air admittance valve, the manufacturer's instructions **must** be followed.

Insulation against freezing is required.

It must be installed at least 1 metre above the highest spillover level.

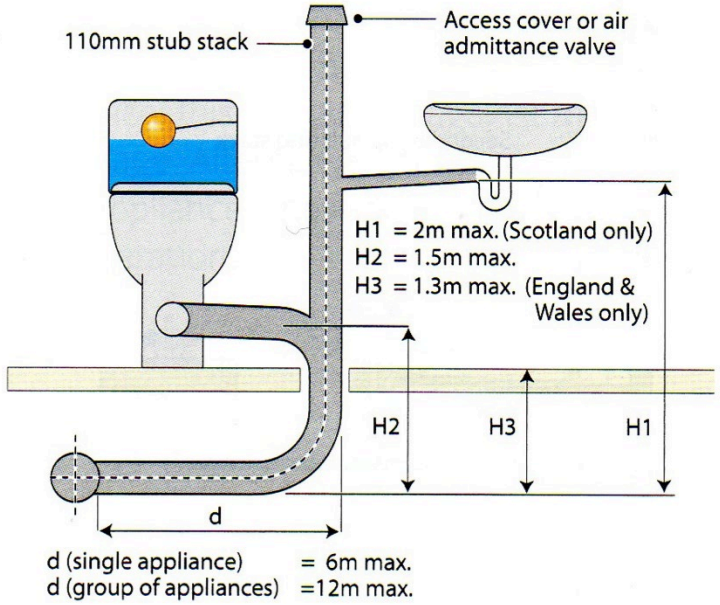


Types of systems

Stub stack

This allows appliances to be connected directly to the drain. Ventilation is only required when the highest appliance is above 2 metres, or the distance from the invert to floor level is greater than 1.3 metres.

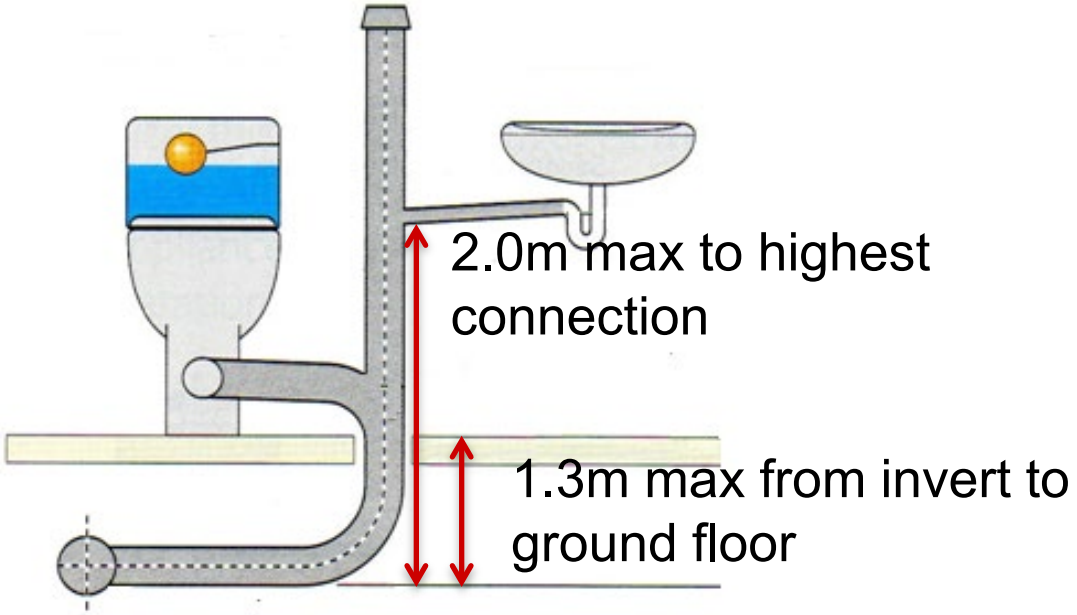
The ventilation can be acquired via an air admittance valve.



Types of systems

Stub stack

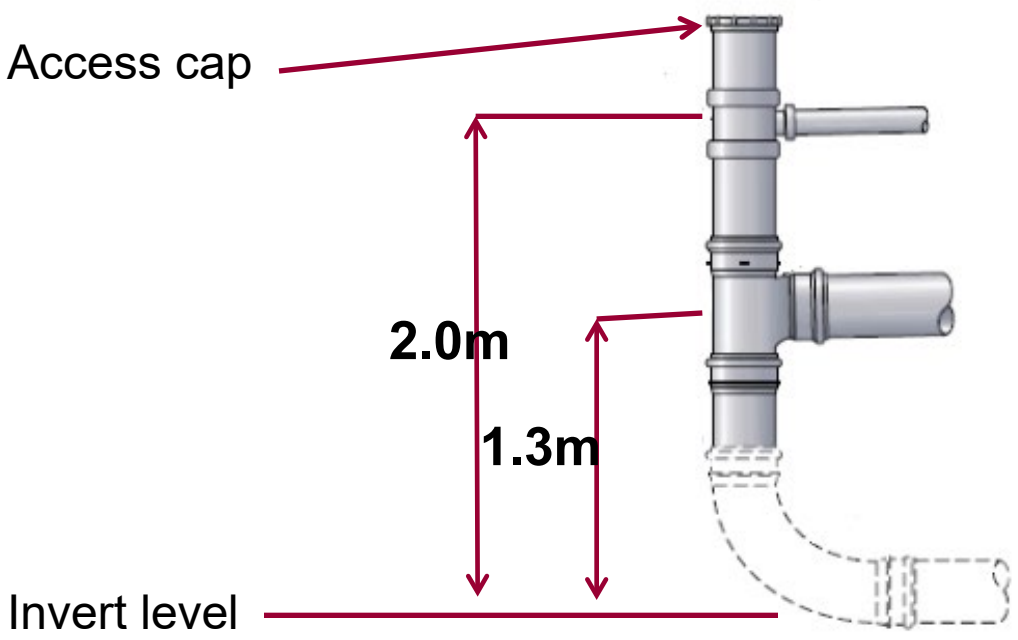
The maximum distance a stub stack can be installed away from the main vented stack (branch drain) is 6 metres. The vented stack must **always** be installed at the head or highest part of the run.



Types of systems

Termination

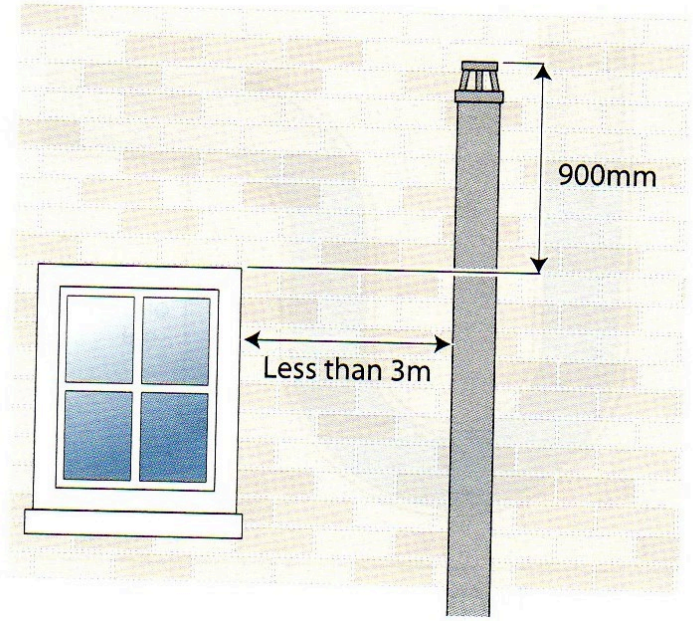
The air admittance valve allows air into the stub stack, avoiding trap seal loss. As the appliance is discharging it sucks air into the stub stack, stabilising the pressure. Normally a stub stack is capped off with an access cap.



Types of systems

Termination

If the soil stack terminates outside the property and is installed within 3 metres of an opening window, the stack should be installed at least 900mm above the window.



Types of systems

Termination

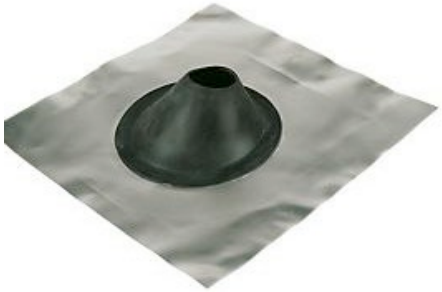
A terminal fitting should be installed on the top of the soil stack to prevent any debris from falling down the stack and causing a blockage. If the installation is in a windy area, a vent cowl may need to be fitted.

Types of systems

Termination

When a vent pipe protrudes through a roof line it will need to be correctly weathered using:

Lead or weathering slate:



Weather collar:

These will stop rainwater penetrating the property.

Types of systems

Grey water recovery

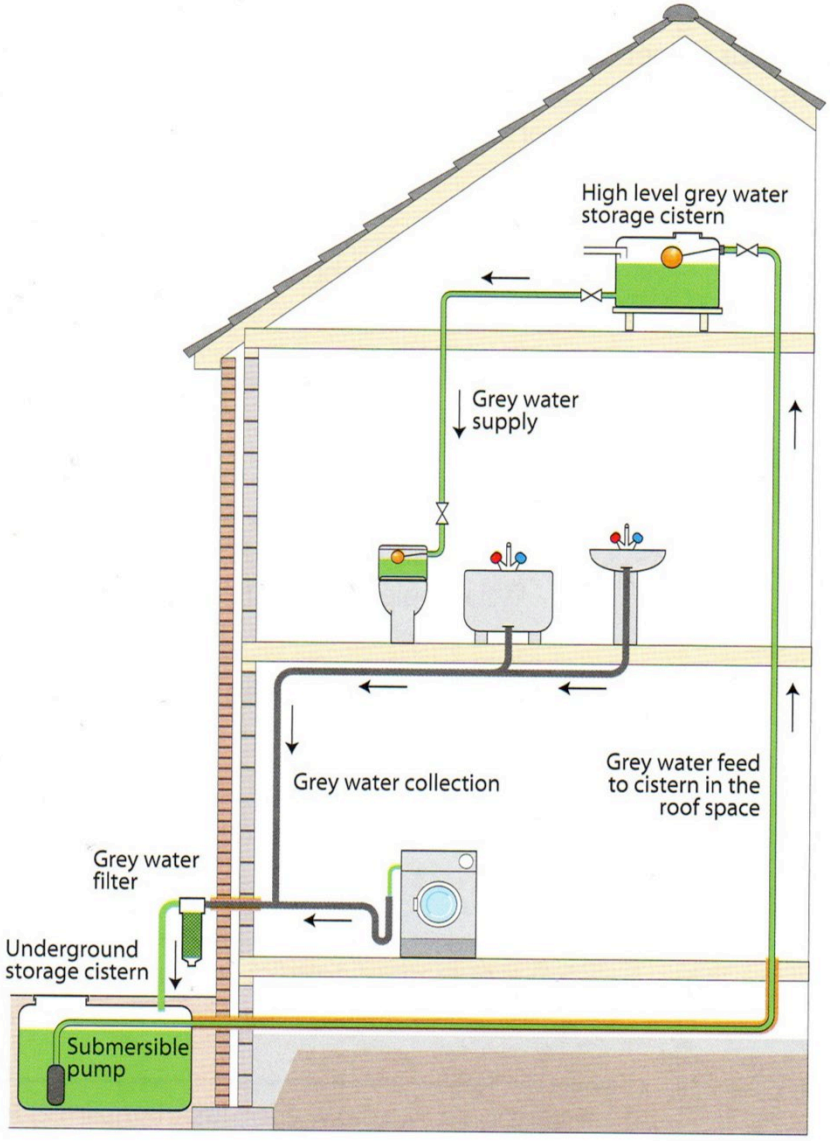
This is a type of recycling, which reuses the water from washbasins, showers, washing machines and baths that would normally be discharged down the soil stack.

Instead it is stored in an underground tank, filtered and cleaned. It is then pumped to a high level cistern (separate to the CWSC) and used to flush WCs within the property.

Types of systems

Grey water recovery

The mains cold water **must** be protected against any contamination via the grey water.



Types of systems

Below ground drainage systems

These systems take the discharged soiled water and rainwater away from the dwelling to the main sewers in the road. From there it travels to the sewage plant for treatment.

There are three main types of systems that properties are connected to:

- Separate system
- Combined system
- Partially separate system

Types of systems

Below ground drainage systems

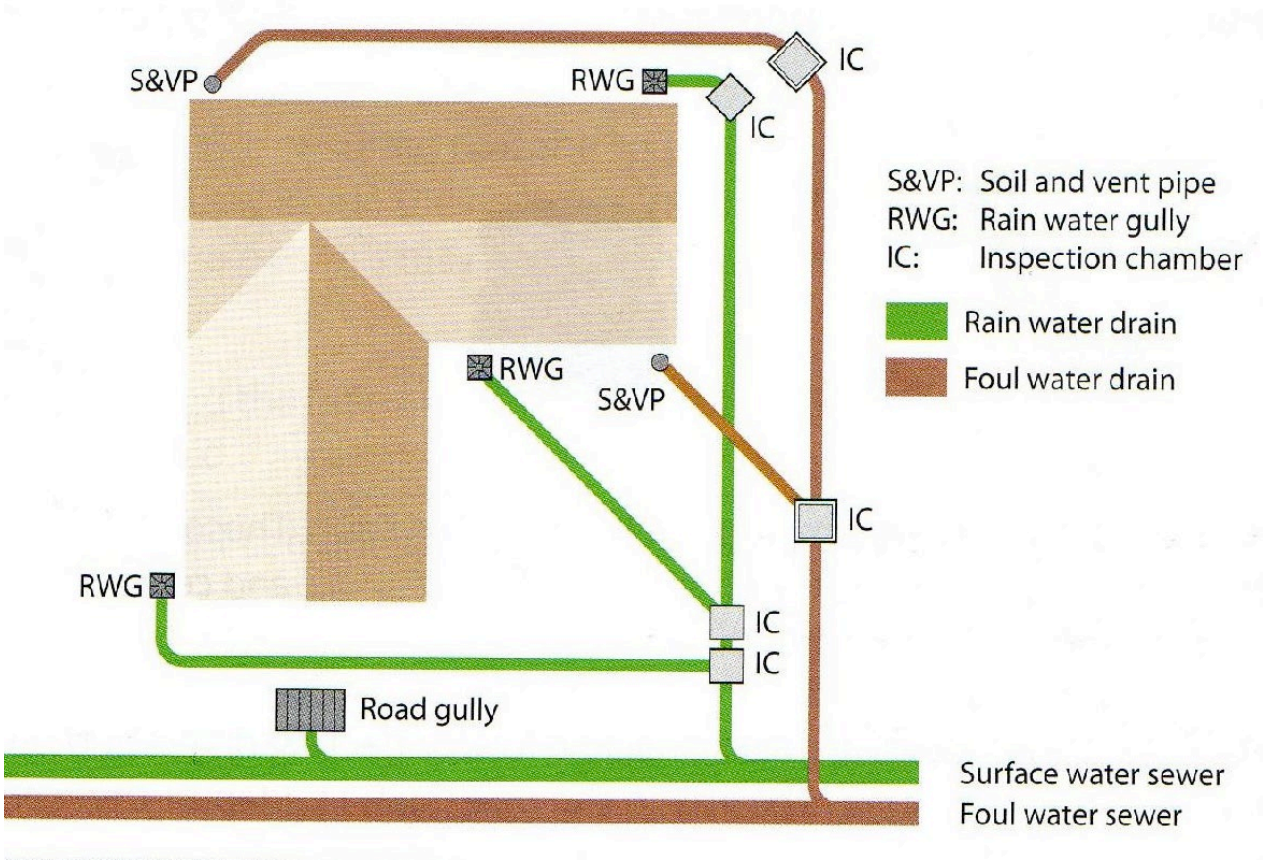
The separate system is favoured by local authorities.

Foul water and rainwater flow in separate drainage systems: the foul water connects to the foul water sewer and the rainwater connects to the surface water sewer (foul water includes discharges from the WC, bath, basin, bidet and sink).

Types of systems

Below ground drainage systems

Separate system



Types of systems

Below ground drainage systems

Separate system

Advantages:

- Sewage plant is not inundated with water when it rains
- No trapped gullies are required for rainwater
- Rainwater does not receive any treatment

Disadvantages:

- Expensive to install
- Foul water system is not regularly flushed by rainwater
- Risk of making an incorrect connection

Types of systems

Below ground drainage systems

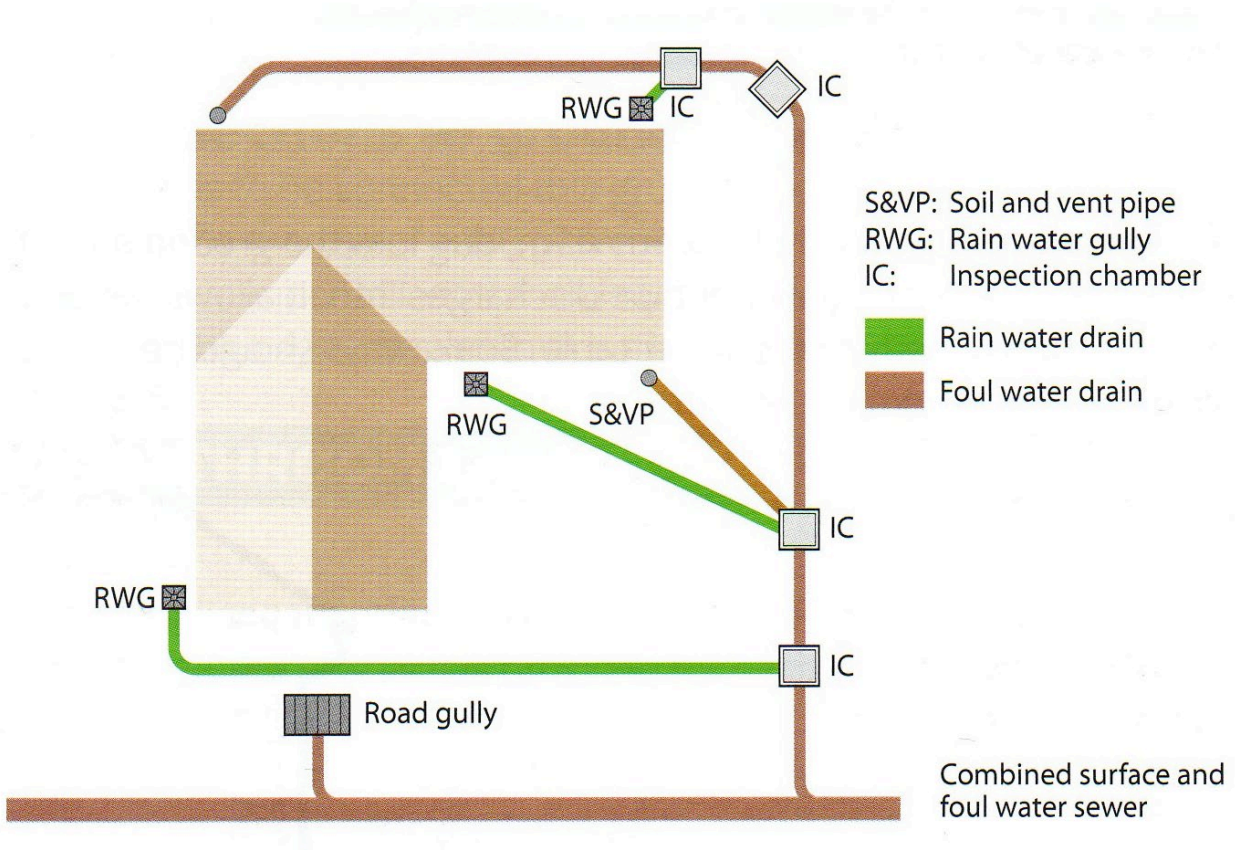
The combined system is an older system, where both the foul water and rainwater discharge into the foul water sewer in the road.

This system is not recognised by the Building Regulations for new builds.

Types of systems

Below ground drainage systems

Combined system



Types of systems

Below ground drainage systems

Combined system

Advantages:

- Maintenance is easier
- Cheaper to install
- Impossible to make an incorrect connection
- All drains are flushed by rainwater

Disadvantages:

- More expensive for the water authority to treat the additional rainwater

Types of systems

Below ground drainage systems

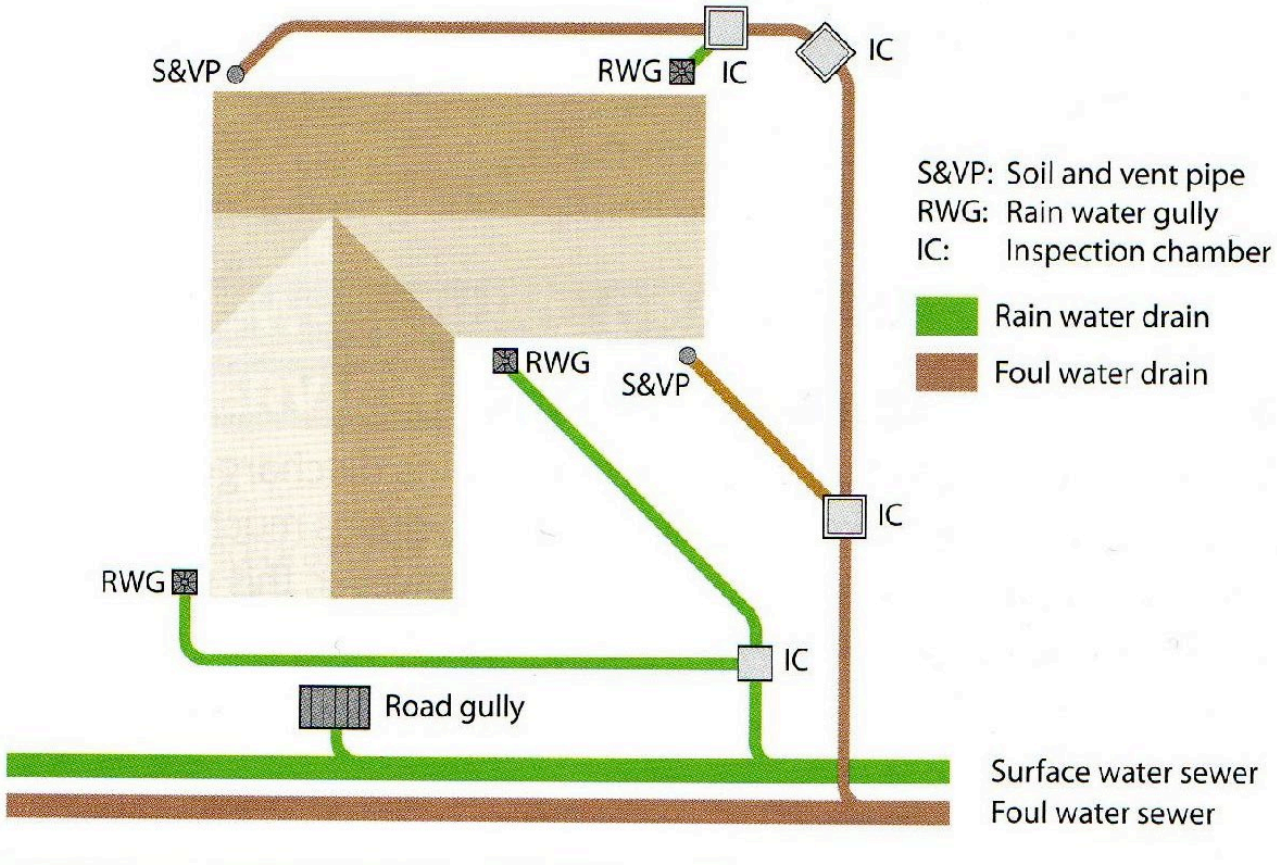
The partially separate system is a compromise between the previous two systems. Most of the rainwater is conveyed to the surface water sewer, and all the foul water is conveyed to the foul water sewer. The remaining rainwater can either discharge in the foul water sewer or via a soakaway pit.

A soakaway is a 1.0m^3 pit filled with gravel/stones where a rainwater discharge pipe is placed. The rainwater naturally disperses in the ground. Nowadays you can purchase soakaway kits.

Types of systems

Below ground drainage systems

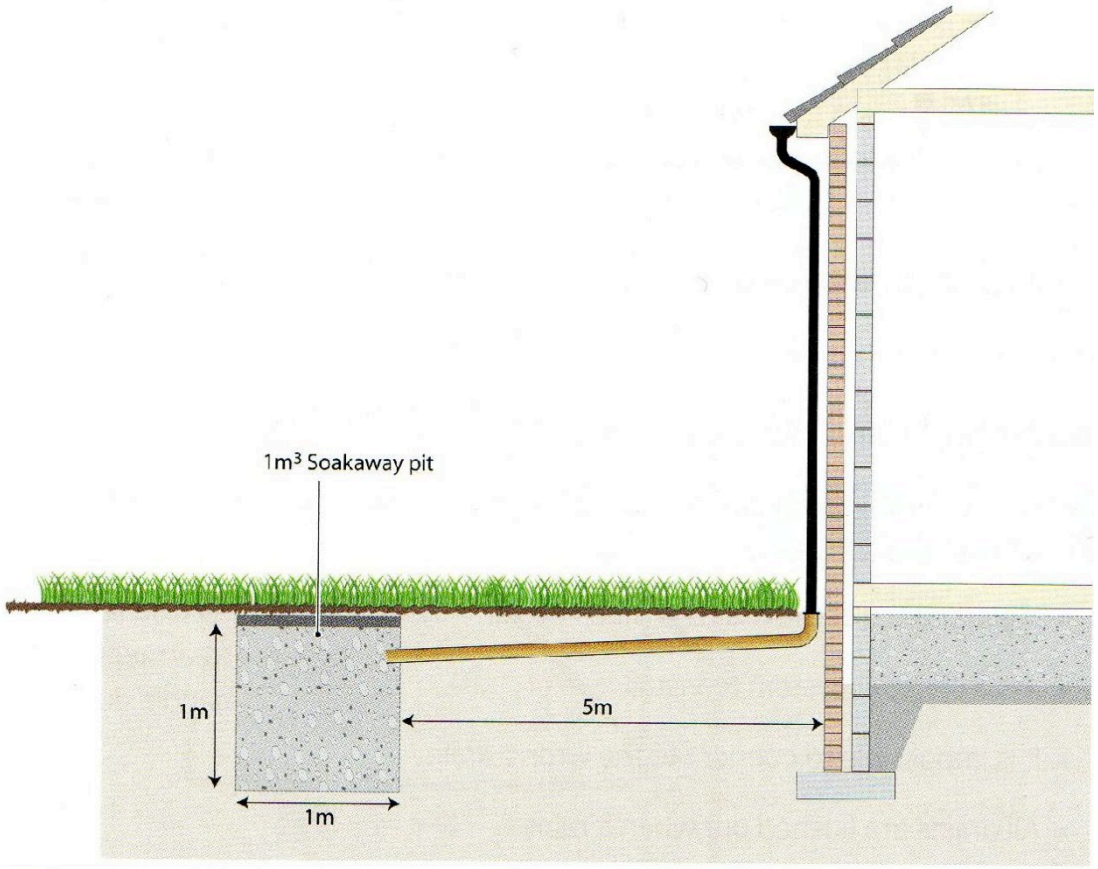
Partially separate system



Types of systems

Below ground drainage systems

Soakaway: used for isolated downpipes from rainwater systems.



Types of systems

Below ground drainage systems

Key:

S&VP:	Soil and vent pipe
RWG:	Rainwater gulley
IC:	Inspection chamber

Types of systems

Below ground drainage systems

Partially separate system

Advantages:

- Reduces overall cost of installation

Disadvantages:

- Care must be taken when installing foul water outlets to ensure the correct system is used