

Unit 209: Drainage systems

Outcome 4 (part 1)

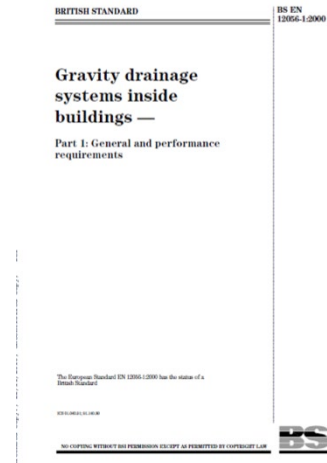
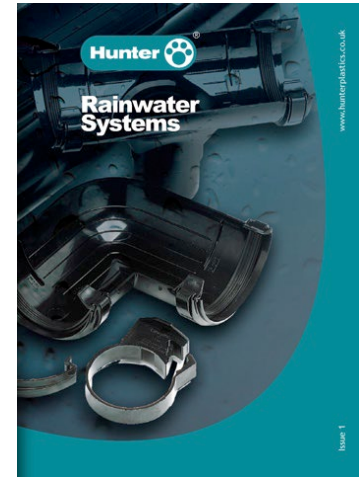
Install and test above ground systems

Legislation and standards

**Building regulations part H:
Drainage and waste disposal**

BS EN 12056: pt 1-5:
Gravity drainage systems – inside buildings.

Manufacturer's Instructions.



Online resource:

<http://www.hunterplastics.co.uk/flipbooks/rainwater.html>

Rainwater systems

All dwellings have some form of collection system for rainwater that falls onto the building. This is commonly a fascia board-mounted gutter that collects the water, which flows to a downpipe and discharges away.



Rainwater systems



Rainwater systems

The main purpose of a rainwater system is:

- 1.To protect the property's foundations.
- 2.Restrict ground erosion.
- 3.Prevent water penetration into the property.
- 4.Provide a means of water collection (water harvesting).

Rainwater systems

The collection of rainwater from any property must be done in such a way that it does not:

1. Create a nuisance for the occupier
2. Damage the property
3. Damage the adjacent property

The rainwater runs off the roof area into a gutter, which channels the water to the downpipe and safely away under gravity (stopping penetration of water into the property) into one of five areas.

Rainwater systems

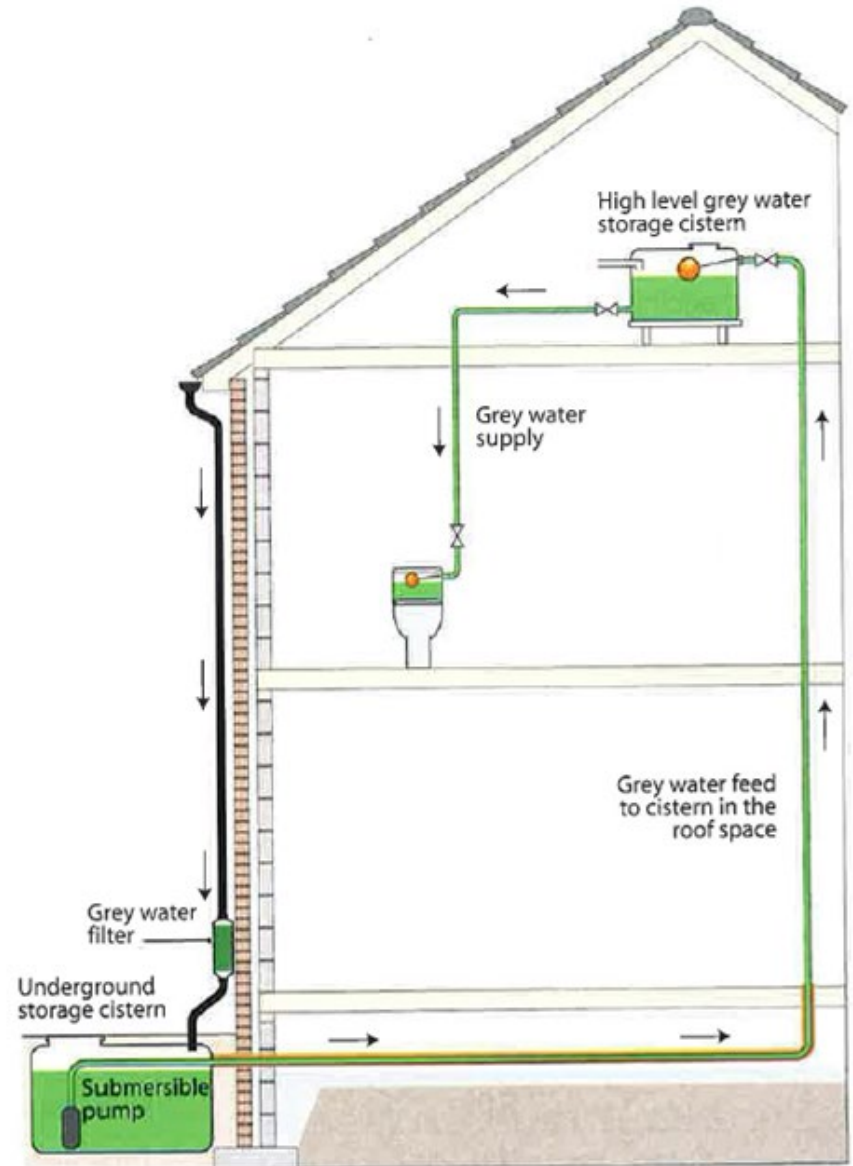
1. Surface water drain: used with a separate system of drainage.
2. Combined sewer: used with a combined system of drainage.
3. Water course: used in rural areas where the rainwater is discharged straight into a river or stream.
4. Soakaway drain: a specially designed pit sited within the property boundary, which allows water to naturally soak away.
5. Rainwater harvesting: a specially designed system where water is treated at a basic level and reused within the property.

Rainwater systems

Rainwater harvesting

This can save a householder large volumes of mains water and reduce the pressure on this resource.

These storage cisterns are installed below ground and collect rainwater from gullies. The average size may be 5,000 litres.



Rainwater systems

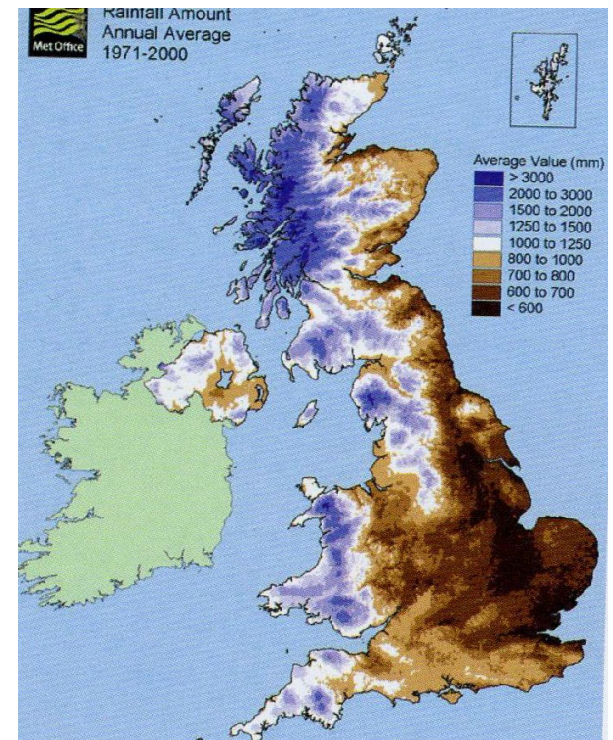
Any rainwater system installed **must** have adequate capacity to cope with the expected flow of rainwater for the area the property is located in.

- Rainfall intensity
- Roof area
- Position and number of outlets

Rainwater systems

Rainwater intensity can be tracked from the met office site:
<http://www.metoffice.gov.uk/climate/uk/anomacts>

From this map – in England, the county of Cumbria (North West) has the greatest total rainfall of around 1.8 metres per year, with Essex and Kent having considerably less.

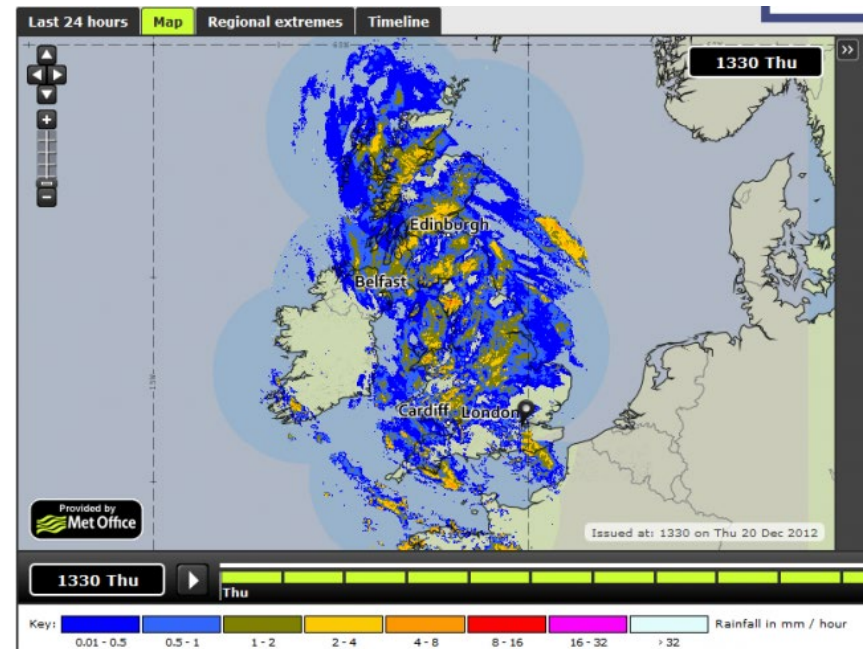


Rainwater systems

Rainwater intensity

The previous map only tells part of the story, as the actual intensity of rain falling in a single period of time was great in Essex.

The rainfall is measured in litres/second/metre square, l/s/m^2 . This is called the **intensity of rainfall** and must be factored into the rainwater system design.



Rainwater systems

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4.2 Rainfall intensity, r

- 4.2.1 Where there is adequate statistical rainfall data related to the frequency of recurrence of storms of specific intensity and duration, the rainfall intensity, r , used in equation 1 shall be chosen with due regard to the nature and use of the building and appropriate to the degree of risk that can be accepted. Where statistical rainfall data is used, clause 4.2.2 shall not apply.
- 4.2.2 Where statistical rainfall data does not exist, a minimum rainfall intensity used as a basis for design shall be chosen from the intensities listed in Table 1, appropriate to the climate at the location of the building and in accordance with national and local regulations and practice. The minimum rainfall intensity shall be multiplied by a risk factor given in Table 2 to give the rainfall intensity, r , to be used in equation 1, unless national and local regulations and practice state otherwise.

Table 1 — Rainfall intensity rates

Rainfall intensity $l/(s \cdot m^2)$
0,010
0,015
0,020
0,025
0,030
0,040
0,050
0,060