

Rainwater Harvesting Case Study

Climate change is a significant challenge both globally and in the UK, conservation of precious water supplies a key concern for everyone. It is therefore not surprising that water reuse, including rainwater harvesting, is being discussed as one strategy to reduce water consumption.

Rainwater harvesting involves the collection, storage and re-use of rainfall that would otherwise go to drain.

This case study looks at Anglian Water's experience of inspecting rainwater harvesting and water re-use systems, it highlights a number of lessons that are relevant to developers, installers, users, regulators and policy makers.

Responsibilities under the water fittings regulations

The Water Supply (Water Fittings) Regulations 1999, byelaws in Scotland, play an important role in protecting public health, safeguarding water supplies and preventing the waste of water across the UK. They set legal requirements for the design, installation, operation and maintenance of plumbing systems, water fittings and water-using appliances. These regulations aim to prevent misuse, waste, undue consumption or erroneous measurement of water and, most importantly, to prevent contamination of drinking water.

Water companies have a duty to enforce these regulations within their appointed water supply areas. They undertake inspections of new and existing installations to check that these regulations are being met. Across the UK, each year around 70,000 inspections are carried out by water companies.

The installation of rainwater harvesting systems must always be notified to the local water company, where there is a public water supply to the same premises.

Rainwater harvesting systems collect water from roofs and it is to be expected that this water will be contaminated with the faeces of birds and other wildlife and may contain pathogenic organisms. It is clear that rainwater harvesting systems can pose a potential danger to human health if they are not installed and operated in accordance with the manufacturers' instructions and the Water Supply (Water Fittings) Regulations 1999. Any connection from the mains supply to a rainwater harvesting system must have a physical air gap in order to prevent any risk of contamination entering drinking water supplies.



Rainwater Harvesting Inspections at Anglian Water

Anglian Water has more than 1200 properties listed as having a rainwater re-use system, in its area of supply which stretches from Grimsby right down to Colchester. Most of these installations can be found in new residential developments of more than fifty properties, but they are also fitted in non-household premises such as schools or supermarkets. In homes, re-used rainwater is predominantly used for toilet flushing. Rainwater harvesting systems make use of a number of designs, to distribute the collected water. Some systems are gravity-fed from loft storage whilst others are fitted with pumps so the collected water can be stored above or below ground.

All new premises with rainwater harvesting systems are inspected for compliance with the regulations before they are connected to the network. This process means that Anglian Water is satisfied that these installations were all complaint when first installed and connected.

However, Anglian Water were concerned that changes after installation which were not notified might result in water quality contamination of wholesome water used for drinking, cooking, washing and other domestic purposes. As these installations were considered high risk between 2015 and 2020, Anglian Water committed to inspecting all existing installations every two years,

Anglian Water's concerns about these high-risk installations was justified as around 70% of existing rainwater harvesting systems inspected, failed to comply with the water fittings regulations. A third of these failures are due to cross connections, often put in to deal with faulty pumps or blocked filters, changes made post installation.

In some residential developments a high proportion of rainwater harvesting systems have failed at an early stage suggesting poor product, design, installation or maintenance. This had led to them being abandoned or temporary repairs made, which have often been incorrectly carried out. In some cases without appreciating the risks direct cross connections have been made between the drinking water and rain water installation.

“around 70% of existing rainwater harvesting systems inspected, failed to comply with the water fittings regulations”

Figure 1 – Cross connection between rainwater and wholesome supply



Figure 2 - Tundish with air gap obstructed



Where an inspection identifies contraventions, Anglian Water ensure these are rectified both to protect consumers and restore compliance.

Anglian Waters' inspectors report that of the properties with rainwater harvesting systems visited, only a few are lived in by people who have a keen interest in water conservation. Instead home owners or tenants tend to inherit the system as it was installed as standard in their property and believe they are fit and forget.

Most home owners or tenants have limited knowledge of how their system works which is a concern when it comes to maintenance requirements. The challenges escalate when a property is in its third or fourth ownership cycle, when it is often the case that information about the system has been lost.

Anglian Water do see exemplar installations that are fitted and maintained to meet the regulations. Unfortunately, the majority of rainwater harvesting systems are in poor condition after a few years and the burden to ensure these are safe falls on home owner or tenant or landlord who have limited knowledge about appropriate maintenance and compliance.

Is rainwater harvesting and water re-use a viable option for water efficiency?

Whilst rainwater harvesting systems have a role to play in reducing water consumption any policy should ensure that it does not cause unintended consequences such as drinking water contamination.

Rainwater harvesting and water re-use systems need to be well designed as well as being installed and maintained those who are competent do so. It is critical that building owners and tenants understand the risks of incorrectly installed systems and ensure they only use suitably competent professionals to maintain their system.

A holistic policy to encourage water re-use also needs to consider:

- How notification of water re-use systems can be encouraged
- How to ensure that only competent installers are used and that they use compliant products that conform to an appropriate quality and standard
- To prevent risks to public health from occurring how information on operation and maintenance of re-use systems is provided to everyone with a rainwater harvesting system installed in their home.



Water Regs UK Limited is a company registered in England.

Registered office address:

6D Lowick Close, Hazel Grove, Stockport, Cheshire, SK7 5ED

Company registration number: 06663930

Contact WRAS on:

01495 98 30 10

email: info@waterregsuk.co.uk

www.waterregsuk.co.uk