UK Rainwater Harvesting Association

Briefing Note

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General Considerations

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Foreword

Water supply, and storm-water management are becoming of increasing concern in parts of the UK, issues that need to be considered from the outset on all new developments.

This briefing note aims to show the variety of rainwater harvesting applications and provide information about the general concept as well as the economic aspects of a system.

Areas of application

Today rainwater is still often considered a problem because it can cause flooding. The perception is that rainwater needs to be drained and disposed of as quickly as possible.

Rainwater harvesting aims to change this perception by retaining the water for non-potable use, turning it into an asset rather than a problem. Rainwater is free of charge and can be used for many commercial applications in:

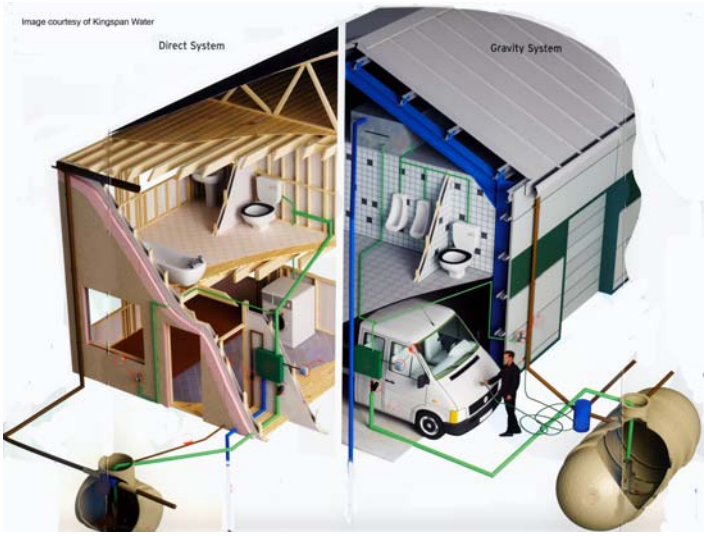
- Factories
- Offices
- Hotels
- Nurseries etc.

Rainwater can be used in many areas of application to substitute mains water:

- Cleaning (outdoor and indoor, cleaning of products and machines)
- Process water (e.g. cooling water, raw water)
- Irrigation and humidification
- Fire fighting water
- Toilet flushing etc.

In industrial applications other water might be reused along with rainwater:

- Cooling water
- Filter backwash water
- Slightly polluted cleaning or process water etc.



Reasons for rainwater harvesting

Potential reasons for installing rainwater harvesting systems include:

- Financial reasons:
  - Reduction of water costs
  - Possible avoidance of surface run-off charges
  - Reduced capital & installation cost for attenuation (by substituting harvesting

tanks for storage tanks)

- Promotional reasons:
  - Enhanced image by showing investment in environmental technology
  - May assist in planning applications
  - May contribute towards BREEAM rating

- Technical reasons: e.g. rainwater is soft and is therefore well suited for cooling systems, for cultivating plants and for many process uses.

- Ecological reasons:
  - Reduced consumption of potable water
  - Reduction of stormwater discharge

General concept

There are a variety of systems on the market but the general concept is always the same:

- The water is first filtered and then stored.
- Water is then pumped either directly to the points of use or to an internal break tank.
- If the system runs low on rainwater a mains water back up unit will guarantee continuous supply feeding mains water into the system.
- When it rains again, the system changes automatically back to the rainwater supply.

Typical system components are:

- Filtration – depending on contamination of the water and on requirements, different methods of treatment are used, but always a pre-storage filter is employed.
- Storage – to balance water yield and consumption. Different material are used; plastic, GRP, concrete
- Technical components – pumps, controls, mains back up
- Overflow – storage has an attenuation function but secure drainage is needed to soak-away or storm drain.

Note: At the point of use separate pipe work is needed in order to avoid potable water and non-potable water coming into contact.

Yield, consumption and quality

When calculating the size of a system one must first look at the volume of water that can be collected (rainwater yield) and then compare it to the amount of water needed (water consumption).

Using the collection area, the local precipitation, filter efficiency and run-off factor the rainwater yield can be calculated. Additional water from some internal processes or other systems, as mentioned before, could be included.

The water consumption is calculated by simply adding up the consumption of the different application areas that can be supplied by rainwater.

Sometimes it is useful to consider using different water cycles due to certain water quality requirements. The consumption of different applications is considered as well as the required water quality.

Water charges & economics

The economy of a system depends on various factors:

- Charges for water supply and sewage services vary greatly between the various UK supply companies, and these charges can significantly affect the potential savings of any system. Frequently there is also a storm water charge that should also be considered.
- The capital cost of the installed system is affected by several factors, including the equipment used and the ground conditions on site.
- Ongoing costs that should also be taken into consideration are the energy cost of running pumps etc and cleaning/maintenance costs. There may also be interest on the capital investment to consider.
- Many components commonly used in rainwater harvesting systems are now included in the Water Technologies List of the Enhanced Capital Allowance Scheme, enabling significant cashflow benefits to be made.