

# GREEN ROOFS

## Eco Fact Sheet 3



### What is a green roof?

A 'green' or 'living' roof is essentially the growing of plants on our rooftops. The insulation properties of soil and plants have been utilised by people for thousands of years, cooling buildings in Africa and helping to retain heat in traditional buildings of North Europe and Scandinavia. Modern 'green roof' systems combine a series of functioning layers, which recreate growing conditions across the roof. Green roofs can be anything from a thin growing layer of sedums and mosses to plants, shrubs water features and even golf courses. However there are two distinct approaches to roof greening:

**'Extensive' green roofs** – generally a shallow layer (25-100mm) of substrate planted with low-growing stress-tolerant grasses, mosses and alpine species. These light-weight systems require little or no maintenance, and do not impose any significant weight on the building structure. **Rubble** or **wildlife roofs** are another type of green roof emerging in this expanding industry. Such roofs are specifically designed to provide a valuable wildlife habitat and replace the 'foot print' of the building on the roof using by products of the development process such as crushed brick and top soil.

**'Intensive' green roofs** – consists of a thick layer of soil (150mm+) in which a variety of plants, vegetables, shrubs and trees can be grown. Such roof gardens are often accessible and can even be used for recreational facilities and public spaces. They provide a valuable habitat for wildlife, but usually require frequent maintenance, comparable to that in a normal garden, and place significant weight on the building structure.

### Are there many green roofs in the UK?

Green roofs remain a fresh and innovative form of building design yet to be fully recognised by developers in this country. Given the competitive life cycle costs of green roofs and their numerous benefits to urban environments it is astonishing that they are not as widespread in the UK as they are in other parts of the world. Only in London (and more recently Sheffield) have there been a significant number of green roof developments, the most high-profile of which include Canary Wharf and Beddington Zero Emissions Development (BedZED). Green roof examples across the rest of the country tend to be restricted to individual dwellings, environmental centres and one-off commercial developments.

### What are the benefits of having a green roof?

#### Economic

- May assist and speed up the process of gaining planning permission
- Insulates the building in winter and summer, reducing heating and cooling costs
- Extends the life expectancy of the roof membrane
- May add to the property value
- Reduces the drainage infrastructure and water storage requirements on site
- Re-uses aggregates that would otherwise have to be removed from new build sites
- Can score highly in environmental building rating schemes

## Environmental

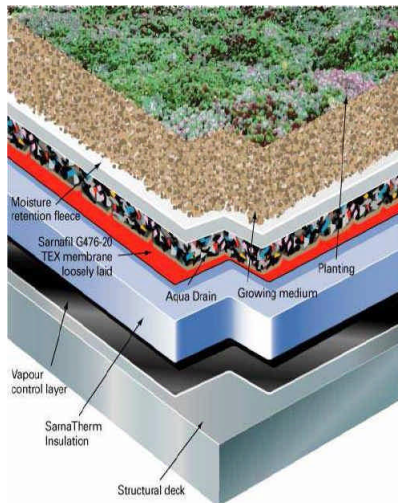
- Reduces run-off by retaining up to 90% of rainfall
- Filters dust and pollution
- Provides a habitat for wildlife
- Dampens noise levels entering and leaving the building by up to 18dB and reduces reflective noise by 3dB
- Insulates and cools the building reducing energy expenditure and carbon emissions
- Reduces the urban heat island effect

## Social

- Provides a public amenity of value to local residents and workers
- Raises the green credentials of the occupier
- Improves the view from surrounding buildings by providing an aesthetic green space.
- Environmental benefits contribute towards improved quality of life.

## What are the components of a green roof system?

In order for plants to grow on our roof tops natural environmental conditions have to be re-created. This can easily be done by the installation of a series of functioning layers which, while retaining the necessary water to support the plants, allow excess water to drain off and protect the roof surface from plant roots and mechanical damage. The diagram below is of a typical extensive green roof system (courtesy of Sarnafil); the illustration is of a completed installation.



## Will my roof leak?

In actual fact the substrate, vegetation and various other components protect the roof surface from harmful UV and other weather extremes, increasing its lifespan by 2-3 times.

## Can a green roof be grown on any pitch of roof?

Green roofs can be grown on any pitch of roof even vertical walls; however roofs of greater than 9.5° generally have specific design requirements. On roofs of up to 35° this can be achieved with the installation of a series of cross batons or grids, which have to be more closely spaced the steeper the roof.

## How much does a green roof cost?

The installation of an extensive green roof is generally considered to double the cost of waterproofing and insulating a roof. The approximate current costs of extensive green roof systems, excluding insulation and waterproofing tend to range from £20-£70 per m<sup>2</sup>.

## What are the maintenance requirements?

Extensive green roofs are designed to be self maintaining and therefore only require the equivalent upkeep of a conventional roof provided that the building owner is satisfied with the natural habitat that develops.