6. Green roofs

PAS 100 compost can provide the organic component of a green roof substrate

Green roofs are vegetated layers that sit on top of the conventional waterproofed roof surfaces of a building. They contribute to sustainable drainage systems (SuDS), which serve to reduce peak rates and total volumes of storm water run-off. The substrates used to support vegetation in a green roof commonly comprise aggregates and various sources of organic material. PAS 100 compost could potentially represent a readily available and sustainable source of this organic matter[1].

There are two distinct types of green roof:

- **Extensive roofs:** have a relatively shallow lightweight substrate which supports low growing, hardy drought tolerant plants such as sedum. They typically have thin substrates of depths up to 100mm.
- **Intensive roofs:** have a relatively deep substrate (>20cm) and as such are heavier. They can support a wide and of plant types from grasses to trees and shrubs. Semi-extensive roofs may have depths of around 100-200mm.

The shallower the substrate becomes, the more important it is for the substrate mix to be correct. Green roofs with low substrate depths can require more exact substrate compositions to ensure vegetation growth[1].

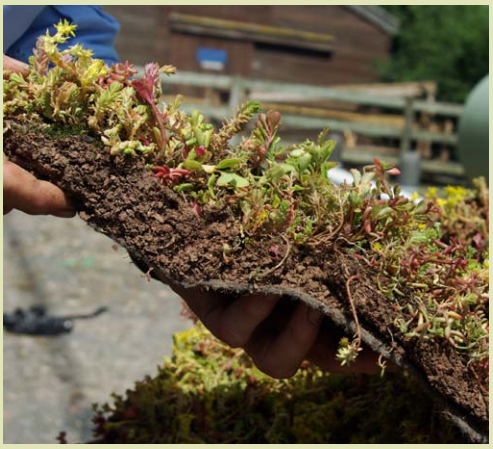
The high nutrient content of compost may be a limiting factor for the establishment of sedums in extensive roofs, since sedum species do not require a high nutrient input. It is therefore necessary to apply the right amount of compost to ensure plant growth is not excessive[1].

The Green Roof Code of Practice[2] provides guidance on installing and maintaining green roofs in the UK. Where appropriate it refers to the comprehensive German roof greening guidelines Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau (FLL)[3]. The FLL guidelines restrict the amount of organic content that can be used. This limitation is to promote sufficient substrate water permeability, long-term stability and oxygen diffusion, together with minimising the risk of fire. However these guidelines state that a higher level of organic content may be required where special forms of vegetation are used. CIRIA has also published guidance on green roofs[4].

PAS 100 compost in extensive green roofs

Recent research provides an assessment of the potential for using PAS 100 compost as a component of the substrate used in green roof construction. It examined the performance of four different substrates in terms of plant establishment and water retention.
The successful substrate mixes comprised[5]:

90% crushed brick and 10% compost
80% crushed brick and 20% compost.



Sedum mat for extensive green roof

Green Roof Royal Horticultural Society (RHS) study

A replicated experiment to examine the growth of five plant species, in green roof substrates using PAS 100 green compost, biochar and crushed brick in different proportions was conducted. Substrate mixes that contained both 35% and 50% green compost performed comparably to a proprietary mix.

The trial addressed concerns within the green roof industry about the inclusion of compost and the effect on substrate shrinkage, run off composition and influence on plant communities. It showed that in comparison with proprietary mixes, it performed equally well in terms of supporting healthy plant growth and run off composition.

Cost savings and other benefits

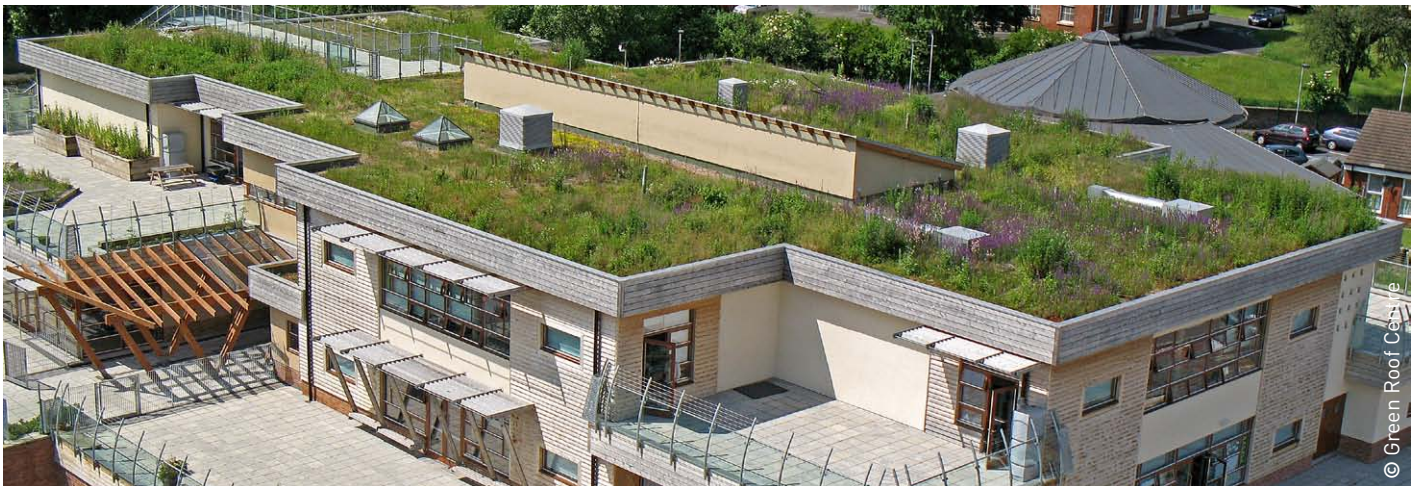
There is a growing realisation that SuDs, including green roofs, can help deliver national, regional and local biodiversity action plan targets in both the urban and the rural context[4]. In the UK, some 20,000ha of roof surface are available on existing buildings without the need for structural alteration. The Greater London Authority alone is calling for 100ha of additional green roof by 2020[6]. The inclusion of a green roof in an application for Planning Consent is already regarded as a positive feature.

Green roofs offer a range of environmental benefits, including:

- reducing rainfall run-off and creating a lag time effect aiding storm-water management;
- insulating buildings[7];
- prolonging the longevity of the roof surface membrane[4] and building (protecting from UV and temperature fluctuations)[5];
- increasing sound insulation[4]; and
- potentially reducing the 'urban heat island' effect and improving air quality[7].

Other considerations include:

- The range of suitable plants able to thrive in growing media containing significant proportions of green compost.
- The capacity for green roof substrates containing relatively large proportions of green compost to support healthy plant growth in the medium to long term due to decomposition causing substrate shrinkage and general loss of organic matter[5].



Sharrow School, Sheffield (image courtesy of the Green Roof Centre)

References

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4 CIRIA (2007), Building GREENer: Guidance on the use of green roofs, green walls and complimentary features on buildings. CIRIA, London
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6 WRAP (2011). WRAP Green Roof Project – Final Report
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