Green Infrastructure Design Challenge

green roof shelters

Healthy, productive and sustainable urban environment and the improvement of surrounding public spaces:

Improves the public spaces around existing buildings, making connections to nature (vegetation, pollination, solitary bee and other invertebrate nesting, bird nesting).

Designs are always dual purpose - parking for bicycles or recycling & refuse bins AND benefits to wildlife and people.

The roofs provide an undisturbed space for wildlife, that is growing rather than inert and with vegetation reflecting the seasons.

Opportunities to improve the liveability of our cities through GI and how GI can make an area an attractive place to work:

From above - looking down from upper floors - shelters present a green roof rather than asphalt or other hard roof surface; and at ground level the organic 'softness' and interest of wildlife habitat panel materials.

How GI contributes to improved health and wellbeing:

Facilitating cycling encourages healthy daily activity as a means of getting to work, school, the shops, out for the evening; older cyclists have the heart function of someone 10 years younger (that doesn't cycle); and it's a fast, reliable way to get around.

Improve air quality / reduce overheating risk:

Roof planting traps airborne particles and has a cooling effect.

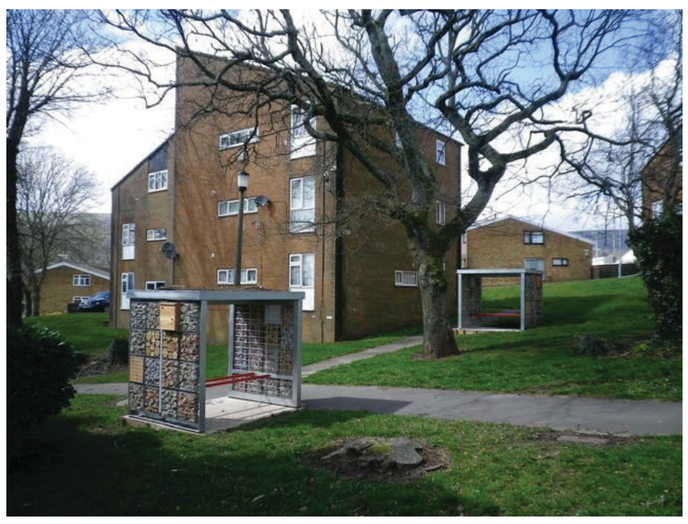
Promote more sustainable transport, such as cycling and walking:

Facilitates convenient secure bike parking close to destination.

Connections:

Can educate users and public about the connectedness of ecosystem services.

Shelters always have graphic interpretation/information explaining planting used and the relationship to wildlife - solitary bees (harmless and important pollinators), butterflies and other invertebrates.



Improve flood resilience:

All green roofs contribute to SUDS; little and many - lots of small green roofs amount to significant areas of rainfall retention.

Improve energy efficiency and climatic resilience:

Contributes to sustainable urban drainage (SUDS) by retaining heavy rainfall and slowly releasing excess over time (shelters have a single downpipe for drip-drainage).

Enhance the primary use of land and unlock additional benefits:

Shelters have the dual provision of utility/facility and wildlife provision.

Shelters are generally planted with drought tolerant native species - using plug plants and seeded with native perennial & annuals.

Native wildflowers and other nectar-rich species provide a food source for bees, butterflies, moths and other invertebrates.

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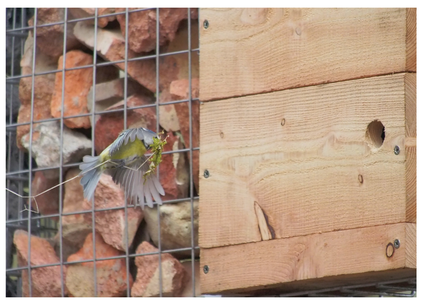
Materials: Structural steel frames (steel content often averages 55% recycled). Locally sourced, reclaimed materials: roof substrate mix of crushed waste aggregate, brick, fines, bark and green waste; locally coppiced chestnut for durable nesting material; other organic habitat & forage materials according to users/location: reclaimed sheeps' wool from packaging, as bird nesting material; bark, teasels, other organic material as invertebrate refuge.

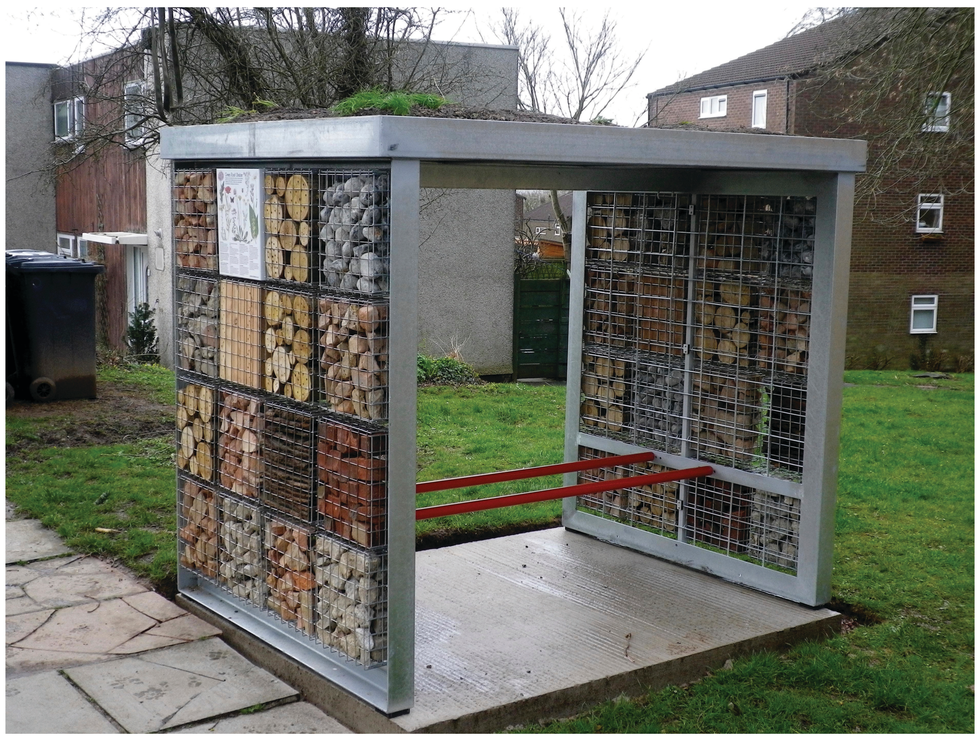


Water retention of roof trays can be individually determined by height of rainfall outlet; conditions can be varied to suit bog-loving plants (in suitable locations) or designed to support particular flora for target invertebrate species.

Shelters can be open sided, timber clad or securely enclosed.

Growing substrate: minimum 150mm deep, low-fertility (similar to chalk downland), locally mounded to create deeper substrate areas / microhabitats (& subsequently different colonising flora).

Substrate 225kg/m2 when saturated. This substrate depth supports a wide variety of plants, that in turn, support pollinators and other invertebrates.

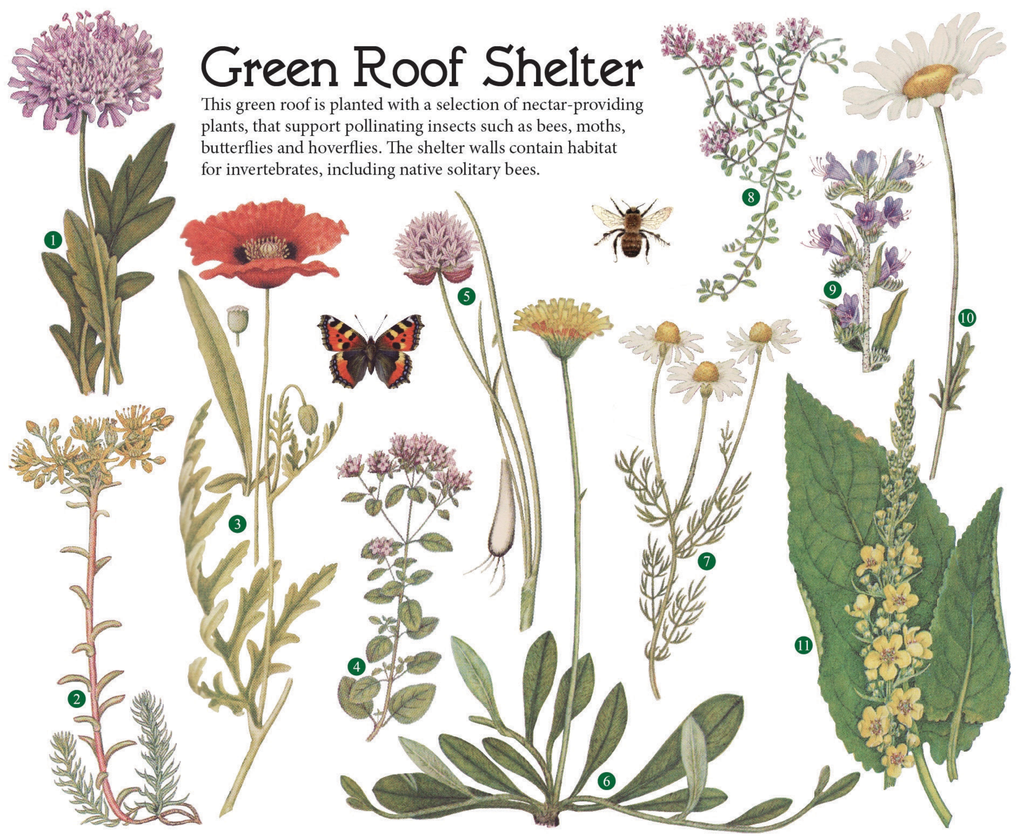


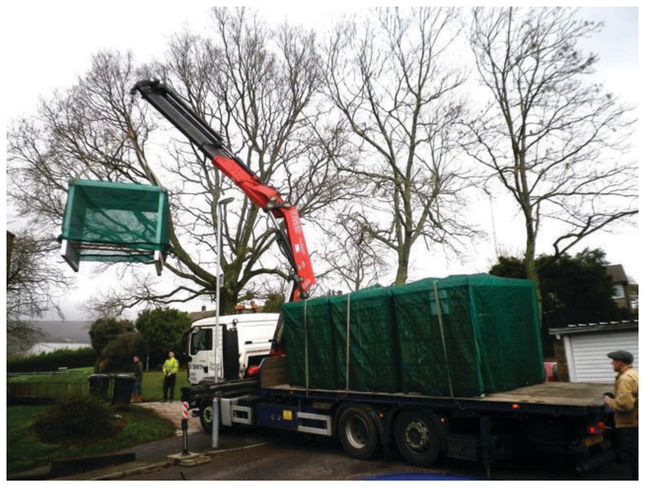
Community engagement: we are well known for our work with communities, from engagement workshops to designing wildlife back into the fabric of buildings.

Shelter units are modular; modules are combined to make larger installations.

Shelters can be simply relocated by owners during their long lifespan, using original delivery method.

Green Roof Shelters are delivered planted and ready to use, with wildlife habitat panels in place. Shelters are simply lowered into final position from delivery lorry's on-board hiab. Depending on ground conditions, minimal groundwork is necessary.





1. Small Scabious
Found on the ground on chalky soils, this delicate plant has small feathery leaves and elegant flower spikes, topped with mauve/purple flowers full of nectar, a favourite with moths and butterflies including the six-spot Burnet moth.

2. Reflexed Stonecrop / Jenny's Stonecrop
This is a good nectar source and unusually is happy in the summer droughts as well as the wet winters. The arched yellow flower heads are particularly attractive to hoverflies.

3. Annuals - Corn Poppy, Cornflowers, Californian poppies and others.
Flower from June to August, often alongside other 'arable weeds' such as Corn Chamomile and Corncockle.
A magnet for bees and butterflies, and gives first year colour, reappearing when the sward opens up after a prolonged drought.

4. Marjoram
The native oregano, its flowers are loved by bees and butterflies. The plants love the heat and stress of a green roof as it mimics the shallow soils and rocky places the plant naturally prefers.

5. Chives, Garlic - wild or culinary
Great green roof plant, survives some of the driest conditions. One of few plants to make it through the spring 2011 drought. Great nectar source and eats and smells lovely.

6. Fox and Cubs
Often found in mown grass, on a roof it has a chance to flower and show the beautiful orange brown blooms the name suggests. Spreads with runners; a good nectar source.

7. Wild Dyers Chamomile
Lovely yellow flower on grey fern like leaves, flowering from May to September and usually found along coastal cliffs, in grasslands and on commons. A favourite of bees and hoverflies.

8. Wild Thyme
Green roofs provide space for delicate plants that at ground level would often be out-competed by more aggressive species. Often grows on old ant hills in the wild and caterpillars of the large blue butterfly feed almost exclusively on this plant.

9. Vipers Bugloss
Flowers have a snake like appearance and are great for bees. Often colonises and tolerates polluted soils and provides food for a range of insects including Buff tailed and Red tailed bumble bees, honey bees and Red Mason Bees.

10. Ox eye Daisy
One of our most common meadow flowers. On a roof, forms small clumps, as it does in low-fertility old meadows, allowing other plants to grow around them. Large blooms appear from May to September and are so bright that they appear to 'glow' in the evening, hence the common names of 'Moon Daisy' and 'Moonpenny'.

11. Dark Mullien
Is a good nectar source and host for the spectacular Mullien moth caterpillar. Seed-eating birds, including Goldfinches, take advantage of the massive number of small seeds produced.

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