



PLANNING GUIDE

Biodiversity Green Roof

Life on Roofs



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Biodiversity – Diversity of Eco Systems

The precondition here is a permanently established green roof that continues to thrive. This requires building-specific planning and the appropriate reliable ZinCo system build-up.

Natural, low-maintenance extensive green roofs above all are important areas of retreat for animal and plant species. Wild bees, butterflies and ground beetles find food and refuge here. The development of species diversity, however, depends very much on how the rooftop habitats that are provided for the plants and animals are actually set up.

Pure sedum green roofs, frequently installed in combination with very shallow substrate depths, do not allow for this potential to be sufficiently exploited.

Meanwhile, the biotope function of greened roof areas can be systematically facilitated with comparatively little effort by using various design measures and by observing the fundamental principles of biodiversity when planning and implementing the project.

When selecting plants, the significance in particular of forage plants for insects and birds can be taken into consideration.



Dead branches and tree trunks can provide valuable structural elements on the roof. They provide a habitat for mosses, lichens, fungi, beetles and flies.



Vegetation-free sand pockets and coarse gravel beds are an important enrichment for the habitat as they are used by insects and other roof occupants as a hideaway, a breeding ground and a sunny spot. There are many more nest aids that help permanent insect colonisation.

These include bumble bee nesting boxes and ant rocks, in addition to insect hotels for wild bees and ichneumonids.

Retro-upgrade of Existing Green Roofs

Existing, species-poor extensive green roofs or intensive green roofs that are hardly disturbed can be converted to a biodiversity green roof at any time. The use of the various biodiversity modules will enable the diversity of fauna and flora to increase substantially. A rich variety of species and ecologically valuable habitats will emerge in particular on large roof areas that have a wide range of vegetation types.

A sound basic knowledge of the ecological interrelations of natural habitats is a must when planning and designing for green roofs rich in species.

The additional load capacity of the roof structure and, where applicable, the height of the connections and finishes of the roof sealings have to be taken into consideration in advance.



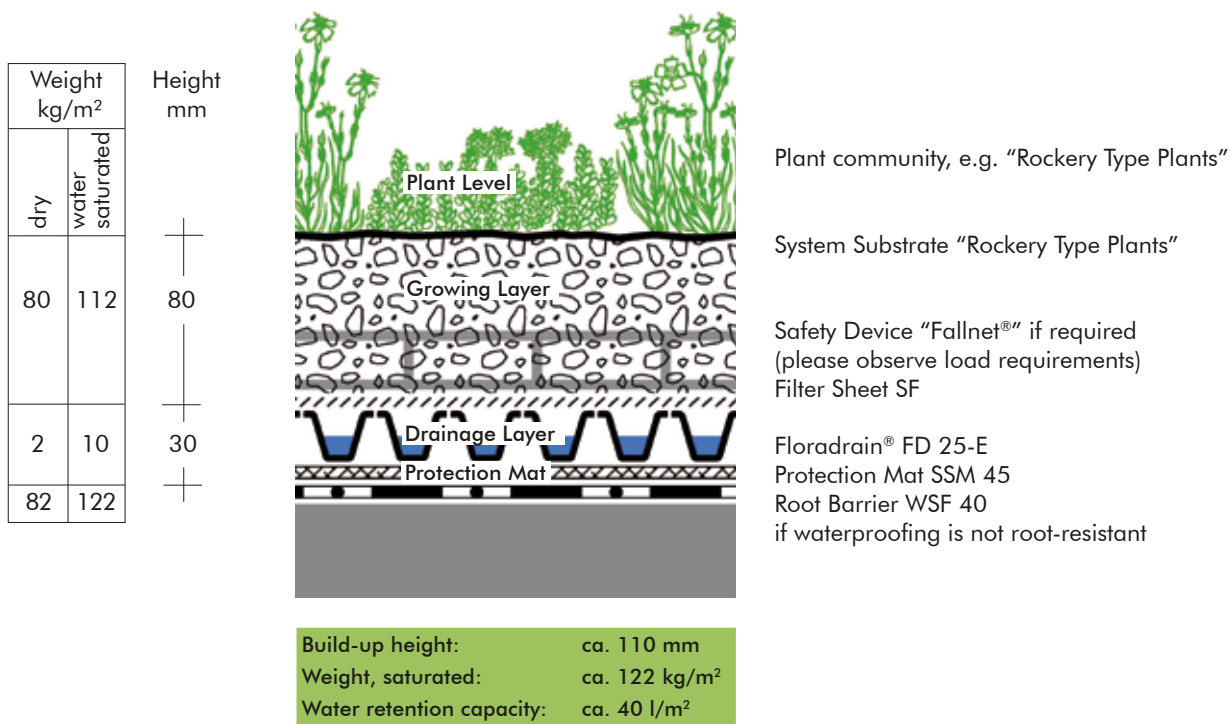
Build-up of a Biodiversity Green Roof

The Basis – Extensive Green Roof

The basis for a Biodiversity Green Roof is a reliable ZinCo System Build-up for an extensive green roof, selected according to roof pitch and roof structure, for example the System Build-up "Rockery Type Plants with Floradrain® FD 25-E".

In addition, the plant community "Rockery Type Plants" already contains a relatively large variety of species and can be easily extended, which is a basic requirement for a biodiversity green roof.

An extensive green roof becomes a biodiversity green roof when various different design measures (biodiversity modules) are applied.



Creating a Biodiversity Green Roof



The basis is provided by the system build-up "Rockery Type Plants", in this case the drainage element Fixodrain® XD 20.



The pre-loaded system substrate "Rockery Type Plants".



Sand, clay and gravel areas and substrate mounds provide structure on the surface.



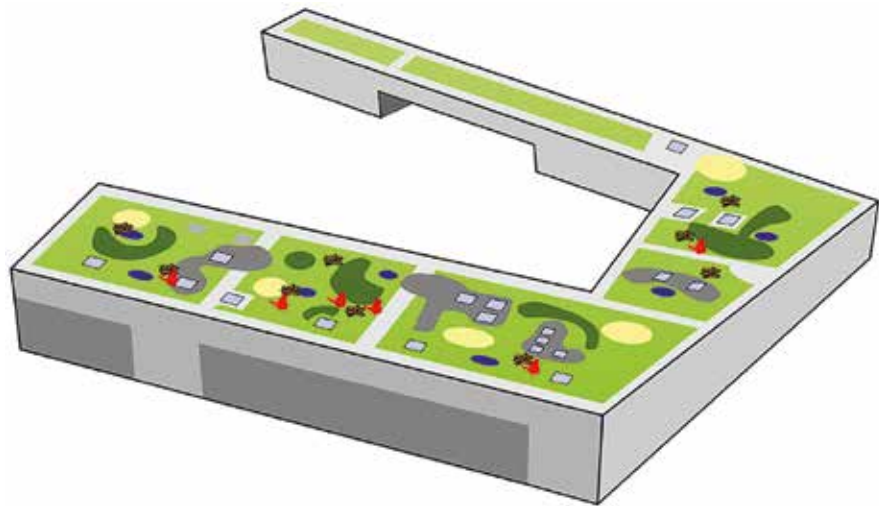
The Biodiversity Modules







In order to promote species diversity based on the fundamental principles of biodiversity, further biodiversity modules are distributed across the area in addition to the standard system build-up.

There are hilly mounds of substrate in some sections and the plant community is extended. Vegetation-free zones such as sand pockets, gravel areas and temporary water bodies are planned. Other structures could be deadwood or nest aids.

As is seen in the model on the right, while it is possible to consider a biodiversity green roof during the planning stage, the individual modules can also be incorporated at a later stage.

Any number of biodiversity modules can be used. Combining many different measures will facilitate and enhance the biotope function of the green roof.



-  Substrate modulation and enhancement of vegetation
-  Temporary water body
-  Sand
-  Coarse gravel or crushed stone
-  Deadwood
-  Nesting aids



Hilly mounds allow for a greater variety of plants.



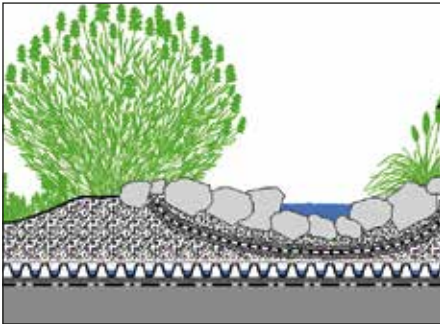
Temporary water bodies are created using drainage pipes and sheeting.



The hilly mounds are planted with forage plants, for example, for wild bees.

Overview of the Biodiversity Modules

Substrate Modulation and Enhancement of Vegetation

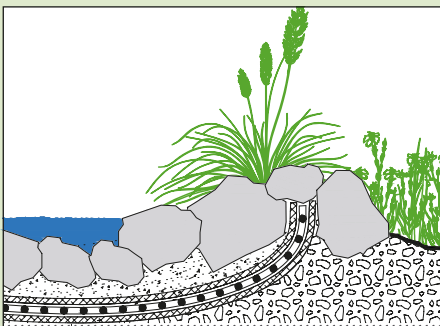


By modelling the substrate surface, the range of plant species can be extended considerably. While Sedum plants and low herbs thrive in the low areas, slightly larger grasses and herbs that require more root space and more moisture can also be planted on mounds of up to approx. 200 mm. The maximum substrate depth depends on the load-bearing capacity of the roof. If some additional organic material, e.g. Zincohum or the System Substrate "Heather with Lavender" is added to the substrate mounds, more demanding perennials and small shrubs can also be planted.



In the lower areas, sedum sprouts and mixed seed can be sown, organic material added to the hilly mounds and more sophisticated perennials planted.

Temporary Water Bodies



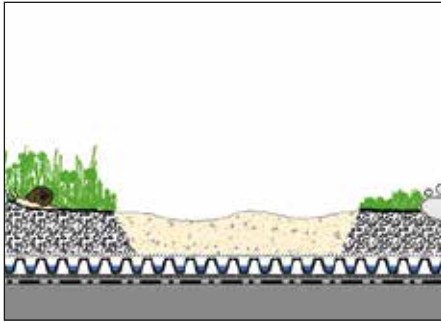
By means of a simple edging and an additional foil covered with sand, e.g. the Root Barrier WSF 40, areas can be created that temporarily store rainwater. In this way, water can be offered to insects and birds as a bathing place or drinking trough. Additionally, such water features create a cooler and wetter microclimate.



Insects and birds need water areas: They can be installed on the roof with sheeting.



Vegetation-free Areas e.g. Sand Pockets

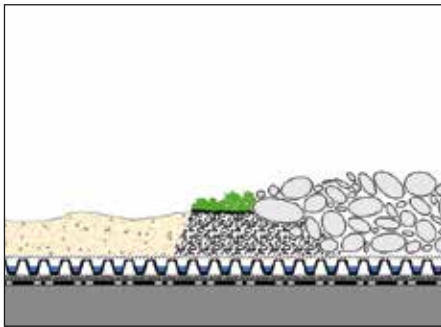


Areas free of vegetation, such as sand, gravel, crushed stone or clay surfaces are also valuable additional habitats on which many insects and invertebrates depend. For this purpose, the substrate is omitted in partial areas above the filter sheet and alternative material is introduced.



Many insects use sand pockets as breeding grounds or sunbathing areas.

e.g. Gravel or Crushed Stone

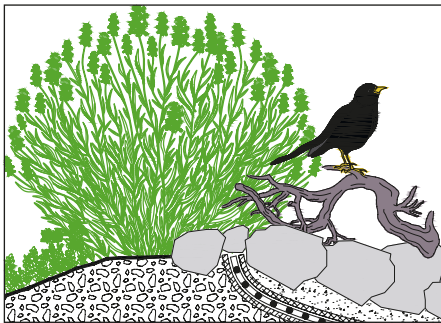


Other species find hiding places and shade between the crushed stones or gravel. Various beetle and spider species use them as hunting grounds.



The vegetation-free areas also help creating various microclimates on the green roof.

Deadwood

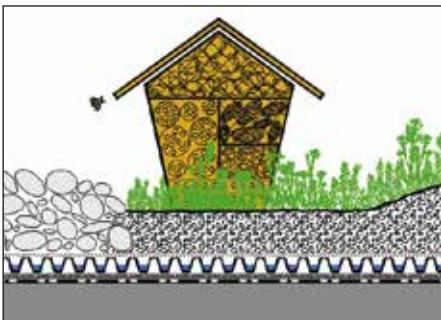


Dead wood is a particularly valuable structural element. On the otherwise very sunny roof, a shady and moist microclimate can be found under and between dead branches and tree trunks, so that mosses, lichens and fungi can also settle. Many small creatures such as beetles, wild bees, ants and flies find a habitat here.



"Deadwood" should really be called "biotope wood" as it is used as a habitat by moss, lichen, beetles and other insects.

Nesting Aids



The use of nesting aids can support the permanent settlement of insects. Nest boxes and nesting aids are available for wild bees, bumblebees, hornets, lacewings, earwigs and other free-living species. Practically all nest box manufacturers offer insect aids, and some nesting aids can also be easily made with limited manual skills.



Nest aids specifically support insect colonisation.

Suitable Plants for the Biodiversity Green Roof



Drought-resistant succulents, herbs, dry grassland species and perennials are particularly suitable. Forage plants for pollinators are of special importance on a biodiversity green roof. The flowering periods of the different species should well spread throughout the growing season, so that bees, butterflies, bumblebees and other pollinators can always find sufficient nectar.

Local biodiversity

For biodiversity green roofs, the use of native species is also possible, as long as they are drought-tolerant and suitable in their requirements for the location on the roof with the selected substrate height. In addition, it is important to consider the planting requirements of wild vegetation, e.g. with regard to layer build-up, substrate type/depth, water requirements and care and maintenance. Local wild plants provide a very special food supply for local creatures, for example, for different types of wild bee.

Application of plants and biodiversity modules

For the planting you can use seed mixtures, precultivated perennials and grasses or suitable precultivated vegetation mats. In addition, ZinCo offers biodiversity kits including a variety of biodiversity module components. Please contact us for more information.

Irrigation, Care and Maintenance

In principal, biodiversity green roofs are low-maintenance. The aim is for natural development without major human intervention. Flowering meadows on the roof are mowed according to requirement and the clippings are removed.



Shrubs must be cut back and emerging seedlings of undesirable species need to be removed. Seed heads can be cut off if excessive self-seeding is not desired for some species. Fertilisation in early spring with a coated, compacted slow-release fertiliser, e.g. ZinCo Plantfit® 4 M, is recommended. Apply fertiliser every 2 – 3 years if required in purely extensive areas, and annually in areas with modulated deeper substrate depths. In addition, roof drains and connections as well as anchoring devices must be checked. Deadwood may need to be replaced from time to time as the branches decompose over the years.

In any case, we recommend concluding a maintenance contract with a specialised company.

The possibility of emergency irrigation during long dry periods should be available to ensure continuous flowering and permanent nectar and pollen supply. By installing a permanent irrigation system it is possible to extend the range of species. As a sophisticated solution, we recommend using the ZinCo system build-up "Irrigated extensive green roof" with Aquafleece AF 300 as a base for creating a biodiversity green roof.

Biodiversity Roofs in Practice

Project Example: Refurbishment Project

Ice Skating and Tennis Club KETV, Karlsruhe, Germany



It was agreed quite quickly that the refurbishment solution for the outdated clubhouse roof of the KETV ice-skating and tennis club would be a forward-looking biodiversity green roof. KETV applied to the city and to the Baden Sports Federation for a grant to green the 235 m² roof. A biodiversity green roof involves some-

what more weight but a check of the structural capacity of the clubhouse roof showed that it was very well suited. The design provided for various vegetation areas with substrate depths of between 10 and 30 cm. By creating hilly substrate mounds, it was possible to use a wide variety of plants.

The water-air household, perfectly ensured by the different function layers of the ZinCo system build-up, is vital for the permanent establishment of the plants. As natural precipitation is sufficient for the selected plants – with the exception of the growth phase – there was no need to plan for additional irrigation.



The KETV roof as a “naked” bituminous roof prior to the re-design as a green roof.



A wide range of biodiversity modules enhance the green roof, providing a new habitat for flora and fauna.



The green roof was combined with the existing solar energy unit – therefore producing synergy effects.

The low-maintenance ecological compensation area on the rooftop.

This planning guide will help with any queries you might have about Biodiversity Green Roofs. Our technical experts are of course here to provide you with advice and support when you are preparing your own building-specific project: from the planning stage right through to the preparation of the bill of quantities texts.

For further information, please see www.zinco-greenroof.co.uk



ZinCo Green Roof Systems Ltd.
F26, Elmfield House · New Yatt Road · Witney, OX28 1PB · United Kingdom
Phone: +44 (0) 1993 229700 · office@zinco-greenroof.co.uk · www.zinco-greenroof.co.uk