



## GREEN ROOF SYSTEMS & ROOFTOP SOLUTIONS

**WALLBARN IS THE UK'S LEADING INDEPENDENT MANUFACTURER, DESIGNER & PROVIDER OF GREEN ROOF SYSTEMS & BESPOKE ROOF LANDSCAPING SOLUTIONS.**

Green technologies are now being used more frequently to enhance buildings and provide a wide range of benefits that are now increasingly important as urban development continues to put pressure on a natural balance of nature, landscape and urban living.

Green roofs can be used to provide visual aesthetics to the construction project, to introduce nature back into cities and to mitigate the impact of densely populated urban areas.

Green roofs and living walls are a useful and increasingly easy and cost effective way to provide attractive, useful, environmentally friendly open spaces on otherwise 'lost' flat roofs and podium decks.

They are adaptable and can be designed for large or small areas on most structural roofs. However, truly understanding the horticultural requirements of introducing vegetation onto artificial surfaces is a discipline that is often misunderstood.



**WALLBARN IS UNIQUE – WE HAVE MANY YEARS OF PROVEN EXPERIENCE IN ALL ASPECTS OF ROOF GREENING AND VERTICAL LANDSCAPES. WE HAVE CULTIVATED A RANGE OF PRODUCTS TO SUIT APPLICATORS OF ALL LEVELS OF EXPERIENCE. WE PROVIDE MODULAR UNITS THROUGH TO INTENSIVE BUILT UP LANDSCAPES, INCLUDING A TOTAL RANGE OF ACCESSORIES AND COMPLIMENTARY MATERIALS. ALL THESE PRODUCTS AND SERVICES ARE AVAILABLE FROM A SINGLE SOURCE.**



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#### **IMPROVING THE ENVIRONMENT**

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- Provides valuable habitat
- Attracts insects, invertebrates and birdlife
- Absorbs CO<sub>2</sub>, pollution and dust particles
- Combats the Urban Heat Island Effect

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#### **INSULATION**

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- Reduces transmission of noise and vibration
- Thermal insulation – absorbs solar heat providing valuable cooling

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#### **RAINWATER ATTENUATION**

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- Absorbs rainwater in the substrate and from vegetation uptake
- Reduces the amount and speed of rainwater run-off
- Delays run-off before rainwater starts to escape from the roof
- Puts less pressure on drainage systems as a whole
- Enhances water harvesting systems

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#### **BALLASTING INVERTED WATERPROOFING SYSTEMS**

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- A valuable and attractive alternative to pebbles or concrete slabs on rooftops to hold down insulation boards or loose laid waterproof systems

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#### **PROTECTING THE STRUCTURE AND WATERPROOFING LAYER**

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- By covering the waterproofing membrane damage caused by UV, impact and abrasion, plant and bird infestation is prevented
- Reduces and regulates the temperature of waterproofing, reducing surface thermal movement

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#### **OPTIMISING THE DEVELOPMENT FOOTPRINT**

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- Provides additional green space and helps BREEAM ratings
- Provides an attractive feature for occupiers to utilise
- Brings a feeling of open space to high density environments
- Can help with the planning permission process
- Can increase the value of the development

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#### **EASY TO INSTALL**

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- All Wallbarn systems have been developed to accommodate straightforward, non-complex installation and build up – improves speed and reduces costs

## PRINCIPLES OF GREEN ROOF DESIGN

Green roof systems are constructed in several distinct layers, all of which are critical to provide sustainable long term vegetation and to minimise maintenance.

All green roofs need light, water, drainage, and correctly engineered soils. Without ALL of these elements the green roof vegetation will not thrive.

The relationship between the different layers is essential, however all green roofs are different so Wallbarn offers design advice to ensure correct specification every time.

The main elements above the waterproof or insulation layer are:



- Geotextile separation and protection layer\*
- Protecto-drain – perforated three dimensional cusped membrane – 8mm, 20mm or 60mm – for both water storage and drainage of excess water
- Geotextile filtration and separation layer\*
- Engineered growing medium / soil substrate (Sedum, Biodiverse and lightweight soil)
- Vegetation (Sedum, wildflower blankets, plug plants, cuttings and seed)

\*Wallbarn uses geotextile fabrics for filtration and separation, made from recycled needle punched polyester.

Substrate composition is very important to the success of a green roof system. Installers need to prevent overloading the roof but also sustain the vegetation to the correct growth level. The type of substrate depends on:

- Weight tolerance of the structure
- Type of vegetation being installed
- Depth of the substrate
- Artificial irrigation

Wallbarn has developed a number of different main substrate types, depending on these factors. We design and mix the exact make-up of the growing medium to suit the specific green roof design.

### TYPES OF GREEN ROOF

- M-TRAY® - Modular extensive roofs
- Extensive green roofs
- Biodiverse & brown roof systems
- Intensive roof gardens

# M-TRAY®

## MODULAR GREEN ROOF SYSTEMS

Wallbarn has designed and developed a brand new green roof system in modular format, called M-TRAY®. This patented and trademarked module is the next generation in green roofing. Wallbarn M-TRAY® has been designed to provide the maximum amount of nourishment and support for the plants whilst keeping the weight of the system down to an optimum level. Wallbarn M-TRAY® is supplied as a ready-grown, fully established sedum, sedum-and-wildflower and wildflower-only green roof in portable, easy-to-fit trays. All growing, filtration and drainage components are included. Transport and handling is easy and mess-free.



The vegetation has been grown onto the M-TRAY®s for a minimum six months to ensure strong, well established, healthy plants, fully integrated into the intermediate layers. This means less shock or bedding-in time and less risk of wind uplift or erosion in the crucial time period after installation.

Each M-TRAY® edge has lugs which can be clipped into the lug of the next tray or unit. The sedum grows above this level to help hide the joints. This interlocking system means that each M-TRAY® is fitted securely to its neighbour with no need for sharp fixings and no synthetic upstands interfering with the sedum growth.



M-TRAY® is 500mm x 500mm x 100mm deep. It is ideal for all roof types and it is simple and fast to install. M-TRAY® is the ideal solution for experienced and the non-professional installer alike, and especially suitable for roofs with very poor access.

Access to the roof is future-proofed. If there are problems with the deck beneath or inspection is required, one M-TRAY® or section can easily be lifted out without any disruption to the whole roof.

M-Tray® is designed and manufactured in UK using recycled polypropylene. It is the exclusive design of Wallbarn, Community Registered Design No. 002953943-0001 and US Design Application No. 29/553,129.

The advantage of M-TRAY® is flexibility. Getting access to the roof is not a disruptive and costly process, which is a huge advantage over loose lay systems. In loose lay designs the whole area may need to be destroyed when accessing the deck.



**Completed two-storey extension on high value domestic property retrofitted by access through adjacent window**

**M-TRAY® has many distinct advantages:**

- Applicators do not need to contend with large amounts of loose substrate on the roof, with the risk of aggregate damaging the waterproof membrane, blowing away or clogging drains during installation
- Substrate depth and makeup is consistent across the whole area
- Mess is avoided on the roof and less packaging and waste is generated
- Modules are packed onto pallets for easy movement onto the roof
- It is ideal for areas with restricted access
- It is a much faster, simpler installation
- Expert landscaping knowledge is not required for installation
- The vegetation is fully established with strong, healthy growth
- Strong root structure reduces dependence on irrigation
- It is an instant green roof, with coverage of over 85%

For sedum roof systems we use a mix of six varieties of sedum, planted from cuttings and placed into a course mix of substrate anchoring the plants. We also produce a sedum-and-wildflower mix (top & bottom right) containing native plants which is designed to attract local wildlife into the area.



## INSTALLATION

The problem of getting living green roof systems onto difficult-to-access roofs is overcome using Wallbarn M-TRAY®.

**M-TRAY® is the ideal retro-fit green roof product.**

M-TRAY® modules measure 500 x 500 x 100mm (deep) and weigh 15-20kg saturated, so installers can carry each module by hand. The modules are supplied on pallets for easy and mess-free transport and movement to the roof and can be craned up onto the roof safely, quickly and easily without any risk of the contents spilling out onto the roof.

The design of the module helps maintain the vegetation during transportation. However, it is essential that the modules are installed as soon as possible as the living plants will start to deteriorate quickly without access to light and moisture.



The waterproofing should be protected with a loose laid geotextile filter fabric and the module trays laid on top. The geotextile helps to filter the water run-off and prevent clogging up the outlet pipes.



Each unit has securing lugs, so one module can be fitted to the next to achieve a secure and seamless fit together. No mechanical fixings are needed to go through into the deck, meaning there is less disturbance to the waterproofing. The weight of the system will hold everything in place.



The edges of the vegetation can be enclosed using an aluminium angle which sits beneath the M-TRAY® unit. A border of rounded pebbles is usually installed around the edges. This prevents the plants or their roots blocking the outlets.



M-TRAY®s can easily be fitted around supported slabs or decking using Wallbarn support pads to give a continuous and seamless surface level. Large areas can be installed in a very short amount of time.

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## EXTENSIVE GREEN ROOFS

The extensive green roof is a simple, low maintenance type of green roof system. It provides an effective way of greening a roof deck and bringing a sense of nature to built-up areas.



The main features of extensive green roofs are:

- Lightweight systems – can be as light as 50kg per m<sup>2</sup>
- Total build-up depth – 100-150mm thick
- Simple vegetation – mainly sedum
- Drought tolerant
- Saline tolerant
- Low maintenance requirement
- Irrigation systems optional

Extensive green roofs are often used on new build developments or to enhance existing buildings. Being comparatively lightweight, at typically 80kg per m<sup>2</sup> (saturated weight) they can be used on a large variety of structures.



The sedum plants we use have been selected to be easy to manage and do not need a large amount of watering, making them ideal for areas which may be overlooked but are difficult to access and maintain.



Our sedum blankets have been grown in our nursery for six months and are grown from a mixture of at least six different species of sedum. This ensures a consistent, all year round coverage of vegetation, with some plants providing colour changes and textures throughout the year. The flowering period is generally June to July.

Mixes of wildflowers, herbs and bulbs can also be incorporated into the blankets. We supply healthy, freshly cut sedum blankets with at least 85% coverage.

## INSTALLATION

Extensive green roof systems are built up in individual layers from the waterproofed deck or insulation layer (inverted roof).

Each component of the system is supplied in rolls and bags and delivered to site on pallets.

The build-up is made up as follows (From base upwards):

- Wallbarn recycled polyester geotextile filter fabric. Wallbarn supplies a range of different geotextile fabrics and we recommend a fabric of at least 300gsm – code PEC-0300-Z
- Protecto-drain. Flexible, cusped and perforated membrane (made from HDPE, available in various sizes – 8mm, 20mm or 60mm, depending on drainage / attenuation requirement). This is loose laid onto the geotextile, cup-side up. This collects water but also allows excess water to escape through the perforations into the roof outlets
- Wallbarn recycled polyester geotextile filter fabric, to allow water to pass through the system but to prevent substrate particulates from blocking the drain
- Lightweight engineered substrate (manufactured from a blend of crushed aggregate, expanded clay pellets, Microlot and green waste to form a gritty mineral based low nutrient mix)
- The sedum blanket is then rolled out onto the substrate and gently pressed into place. Alternatively, plug plants are installed over the surface



Wallbarn also has a sedum / wildflower mix blanket for use in extensive green roofs as a standard item. These blankets can also be plug planted with herbs and certain dwarf plants to add variety to the roof finish.

Parapets and upstands should be kept clear of plants, to avoid roots clogging outlets and vents, and to reduce fire risk. A border of rounded riverstone pebbles should be constructed around the edges.



Where there is an exposed edge with no parapet, a perforated aluminium angle is used to provide an edge to the green roof itself. The pebbles are then installed the other side. This ensures free flow of drainage water.

Extensive green roof systems, whether being the roll-out version or M-TRAY® modular extensive roofs, can be constructed so that soft landscaping and hard landscaping fit seamlessly.



## BIODIVERSE & BROWN ROOFS

Biodiverse roofs and brown roofs are two different things:

- Biodiverse roofs are where seed or plants are introduced into the substrate at the time of construction
- A brown roof is where the substrate surface is left to self-vegetate from windblown and bird lime seed dispersal

After several years both type of roof may look the same as the vegetation reaches maturity.



They have become a popular type of roof garden finish in recent years as they are seen by many planners as a more natural, rugged urban feature and can offer a greater diversity of species as well as prolonged foraging for insects.

The concept of biodiverse roofs is that a plain, low nutrient environment is created at roof level.

Tough, hardy plants will start to germinate in the substrate in a natural way, replicating wild urban spaces that are found at ground level.

Wallbarn uses wildflower seeds that are mixed into the substrate, plug-plants or our new pre-seeded BeeMat (two layers of biodegradable fabric impregnated with wildflower seeds to guarantee an even spread, and to provide an ideal climate for germination).

Biodiverse roofs require fairly little maintenance. They still offer sound acoustic and temperature insulation properties to the building, and will help to attenuate water runoff from the rooftop to a significant degree. The substrate level is normally up to 150mm, which offers a medium weight build-up, usually no heavier than 120kg per m<sup>2</sup>.

Often objects such as rotting tree stumps, stones and rocks can be introduced onto the area to encourage insects and other wildlife.

Waste material from the construction process, such as crushed aggregate and concrete, can be introduced into the substrate, adding to a sense of recycling elements of the project.

However, caution must be exercised when using waste from the site to avoid contaminated material or sharp objects, which could damage the waterproofing being placed onto the roof.

Biodiverse roofs can be used to replicate and replace the ground terrain prior to construction taking place.

Wallbarn M-TRAY® can be produced as biodiverse modular roof system by adapting substrate and vegetation type to suit the project requirements.



## INTENSIVE GREEN ROOFS

Intensive green roofs consist of much deeper substrates which give far greater scope to design and grow more interesting and elaborate gardens onto concrete decks.

They are more akin to traditional landscaping but positioned on a roof.



So long as the structure can support the weight, almost unlimited planting and landscaping can be achieved, including large shrubs, grassland, flowerbeds and even trees. Intensive green roofs tend to be areas where greater access and people traffic is envisaged.

Intensive green roofs offer considerable benefits to the urban landscape far and above anything a light sedum roof can offer. With the increased soil levels and intricate planting, natural gardens and parkland can be recreated on rooftop level.

Wallbarn provides design consultation to integrate hard and soft landscaping materials to maximise the project potential. We supply all components required for intensive green roof systems which allow the installer to purchase drainage materials, soils and other associated products from one single source. Issues such as increased weight, irrigation and maintenance need to be considered at early design stage.

- Intensive green roof systems magnify the environmental and aesthetic benefits of green roofs
- They offer greater biodiversity
- There is more dust and pollution absorption
- They give a higher level of water attenuation and delay of water run-off
- They give improved thermal and sound insulation benefits
- Lush, luxurious roof gardens have been proven to increase the value and accelerate the take-up of buildings when offered on the market. This can increase the speed of sale as well as rental yield
- The footprint of the building is being optimised. There is less wasted space in densely populated areas and there is increased amenity value

The build-up of intensive green roof systems differs from project to project and as such, Wallbarn should always be consulted at concept stage to advise on correct product selection and use, in particular in relation to the vast array of waterproof systems used in UK.



Our all-encompassing rooftop solutions service will include additional products and services for the scheme, such as paving and decking, protection and design services.

All these products are available from Wallbarn:



ASP support pads - adjustable height support pads to hold paving slabs – for hard landscaping areas on roof



Timber decking tiles – South American hardwood timber tiles to create fast, durable and beautiful timber terraces on roofs and podium decks



Fixed height supports - fixed height support pads for more cost effective suspended paving areas



Roof outlets & drain connectors - moulded synthetic outlets to protect and waterproof drainage outlets on roofs which are vulnerable to leaks. Designed to bond to the waterproofing



TD support pads - Adjustable supports to lift timber decking off the roof structure, protecting it from damage and keeping the timber decking away from standing water



Geotextile fabrics – for use within green roof systems as also as stabilization, filtration and protection membranes for landscaping, civil engineering and roofing projects



Easyclick decking system: Super-fast decking installation system with no screws, fixings or timber battens required



Protecto-drain for vertical applications as a waterproofing, protection and drainage membrane for subterranean structures



Megapad & TD Megapads – heavy duty support pads for paving and decking. Each unit is capable of holding 800kg



Protecto-board – bituminous protection membrane to prevent punctures and abrasion to bituminous waterproofing



Protecto-drain drainage channel: A15 drainage channel in HDPE with steel grate for pedestrian uses



Wallbarn offers a complete range of solutions for green roofs and roof gardens from the smallest domestic terrace to large scale green roof and living wall projects, we can design the scheme and tailor the most suitable product for the client's needs.

All our live products are grown in British nurseries over a period of at least six months.



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