

GREENFIX

ENVIRONMENTAL SOLUTIONS

**FOR
SUSTAINABLE
ENVIRONMENTS**

**VEGETATION ESTABLISHMENT
SOIL REINFORCEMENT
EROSION CONTROL**



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Greenfix specialise in the supply of low impact, environmentally sound solutions for erosion control and soil stabilisation problems including vegetation establishment, utilising the latest biodegradable and synthetic engineering materials for:

- Railways
- Highways
- Drainage channels
- River Banks
- Cliff protection

NEW PRODUCT DEVELOPMENT

- Green Roof Systems
- Fireproof blankets
- Turf reinforcement mats

Design: Greenfix provides full design assessment for all schemes with confidence.

Supply: Fast, efficient supplies and deliveries with all seeded products manufactured fresh to order within days. Large stocks held at depots.

Installation: UK coverage using experienced and fully trained installation teams gives total cost effective and rapid service, for all Greenfix products.

Manufacture: Product manufacture is available in all our regions enabling non standard and tailor made solutions.

Soil erosion control, soil stabilisation or earth retention?

Soil should be looked at in three parts:

- 1) Topsoil** - Uppermost layer comprising of disintegrated rock particles with an a mixture of organic remains and materials. Generally loose, friable particles with little or no cohesive properties. Will sustain plant growth.
- 2) Subsoil** - Secondary layer of disintegrated rock particles with little or no organic matter. Generally but not always firm cohesive material with some capability of sustaining vegetative growth.
- 3) Base soil** - Comprising of sedimented, compacted or large rock masses, with no real ability to sustain plant growth.

Erosion control deals with preventing the wearing away of the upper soil layer. Soil is eroded by the actions of an external influence such as rain, water run off, wind or foot and animal traffic.

Soil stabilisation deals with reinforcing the subsoil and topsoil layer where these layers become detached from the base soil layer. Instability can be caused by water ingress between the layers, steepening the embankments where gravity pulls the layers down and newly soiled embankments where lack of cohesion reduces the frictional resistance between layers.

Soil reinforcement is where the whole soil mass needs restraining and in particular where the base soil is to be steeper than its natural angle of repose. A retaining wall may be needed to hold a slope in place to allow the construction of buildings or roads and railways.

Depending on the site specific design constraints one, two or all of the above methods in combination can be used. This use of combining solutions within one design can lead to considerable cost savings as generally erosion control and soil stabilisation solutions are significantly cheaper than retaining walls.

Greenfix- What do we do?

Greenfix has been involved in soil erosion control and reinforcement for 16 years and has worked within every sector of the construction, civil engineering and landscape industry. Our expertise has led to the development of a unique range of products that have been responsible for changing the way many engineers look at embankment and even landscape design.

Greenfix has pioneered the use of natural biodegradable materials, in particular, Barley straw, Coir (coconut), Jute, Wool/Hair, and more recently fireproof Seagrass fibres. We have developed methods and applications to tackle every type of erosion and stabilisation problem from embankments, cliff faces, rivers, streams, lakes and ponds, sand dunes, car parking and fire access to vegetating green roofs, reed beds, sound bunds and acoustic barriers. Over 5 million square metres of Greenfix blankets and grids have been installed in the UK alone.

Why natural materials?

With most applications a natural vegetation is the ultimate design aim when tackling erosion control and soil stabilisation problems. Grasses provide sustainable long term erosion protection- the stems absorb rain energy, slow down water run off and trap sediment, and cushion the impact of foot and vehicular traffic.

The grass root matrix reinforces the topsoil and binds it to the subsoil layer, the roots improve drainage and aeration. Movement of soil particles is minimised due to the dense web of the root structure. Tree and shrub stems, leaves and roots also provide similar functions but with the added benefit of giving a deeper subsoil reinforcement. Greenfix materials offer short, medium and long term support to assist natural development of plants and grasses which will give the ultimate long-term and sustainable solution.

All our materials degrade in harmony with the development of the vegetation. The conditions that accelerate decomposition of our blankets and grids i.e. warmth and moisture, also are the conditions in which grasses and plants increase growth.

The Greenfix Principal

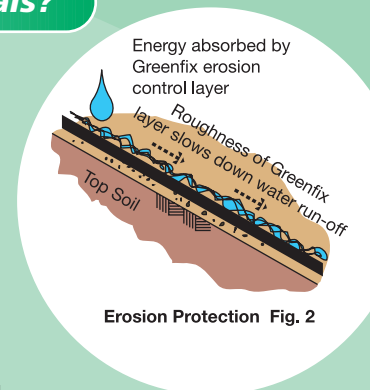
Because our products have been developed to degrade in harmony with the natural growing process, most Greenfix materials:

- Leave no harmful pollutants in the soil, (heavy plastic netting can take hundreds of years to degrade and serve no short or mid-term benefit to erosion protection).
- Do not present a hazard to wildlife (wading birds get tangled in synthetic nets and can choke on plastic fibres).
- Use recycled and waste fibres which minimises impact on the environment. (The environmental cost of producing and using new plastic is incalculable).

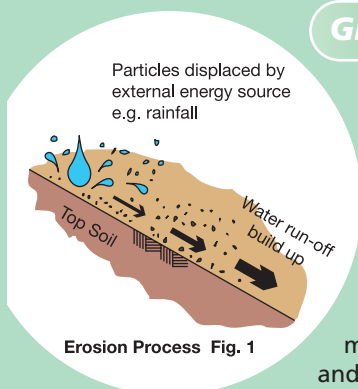
Greenfix understands that a soft engineering approach is not always practical but by promoting a natural vegetative design solution, the impact of hard works that may be required is reduced, an increase in bio-diversity is created and an aesthetic and cost effective solution can be had.

Greenfix also recognises the importance of selecting the correct plants and grasses that will develop and benefit the specific site conditions.

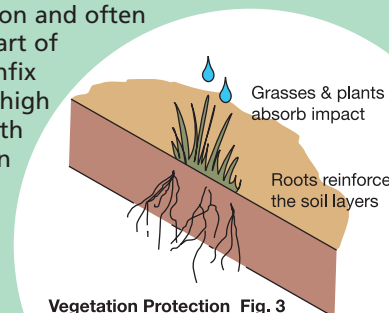
We have had many years experience in materials application as well as seed and plant selection and often use local provenance seeds as part of our total design solution. Greenfix offers the assurances of proven high quality materials and design, with many years of practical hands-on knowledge and experience to make us Europe's leading experts in erosion control and soil stabilisation solutions.



Erosion Protection Fig. 2



Erosion Process Fig. 1



Vegetation Protection Fig. 3

Soil erosion control by grass establishment - Pre-seeded and Un-seeded matting

Soil erosion normally results from displacement of soil particles by the impact of raindrops, by water scour or by wind energy on a dry surface.



Where natural vegetation is the ultimate answer, Greenfix helps nature to help herself by stimulating the natural protective growth which eventually replaces the matting.

Biodegradable quilted mats prevent erosion by absorbing the energy of impacting rain and isolating water scour by only permitting water to soak through its matrix to the underlying soil and thus negating

erosion forces. Greenfix soil erosion control mats consist of coir (coconut fibre) and straw fibres, stitched together with lightweight reinforcing polymer mesh or jute scrim. The result is a strong, flexible, close-textured quilted mat that provides a barrier against wind and rain, giving total protection to the soil. The development of a strong grass sward provides the long term solution.



The natural constituents of the matting biodegrade in harmony with sward establishment. The polymer grid stays intact longer than a jute scrim shaded from ultra-violet radiation by vegetation to reinforce the root matrix of the turf.

Covamats & Eromats

Greenfix matting products are designed for simple, cost-effective erosion control and plant establishment.



The range has evolved out of proven straw-layering techniques developed over many years, now used in drainage, reclamation and landscaping. It consists of biodegradable matting made from natural materials such as coir fibre, cereal, straw and cotton waste. Greenfix matting is designed to help nature generate grassy swards and also matting designed to encourage plant stock in hostile climates or difficult growing conditions.

provides excellent erosion protection but will not be ignited by cigarettes or vandalism. All blankets are available with jute stitching and scrim or with polypropylene netting where a stronger mesh is required.

Covamats and Eromats are also available with 3-dimensional polypropylene netting for extreme circumstances where the turf root structure needs additional support.

The matting is easy to handle and install. It is economical and offers the most effective and simple answers to soil stability problems.

Covamats are a 10mm thick quilted straw/coir fibre mat with added mulches and a choice of seeds incorporated during manufacture.

Eromats are 7mm thick quilted straw/coir fibre mats for separate seeding or planting.

F3 as above but with fire proof fibres.

F3 - Fire resistant blankets

Greenfix has now developed a fireproof blanket for use on vulnerable areas, such as road sides, etc. where risk of fire could be a hazard. Our Covamat and Eromat F3 range are made from natural seagrass fibres which

Seeded mat example



1. Established grass sward
2. Mat matrix seeded during manufacture
3. Seed retaining paper
4. Natural fibre matrix
5. Sandwiching polypropylene or jute
6. Vulnerable soil
7. Protected soil

Uses

- Freshly soiled embankments
- New cuttings
- Lining new or eroded watercourses
- Protecting tidal zone reinstatements
- Balancing ponds
- Facing reinforced soil structures
- Lake edging
- Establishing wild flowers
- Road ditching

HOUSING DEVELOPMENT, SWINDON

New vulnerable soils required instant erosion protection due to the risk of flash flooding.

Pre-seeded COVAMAT TYPES 2 & 3 were used.



CENTREPARCS, LONGLEAT

Existing streams had to be widened to accommodate flash floods. Their natural course is being retained by the use of COVAMATS.



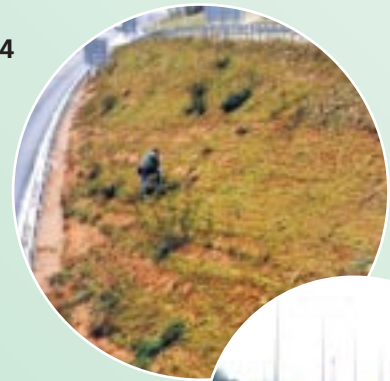
RIVER FROME

Engineers required a new river channel. Natural features were achieved within weeks by using COVAMATS to protect exposed soil of the newly cut channel from water scour.



M5, JUNCTION 4

Constant erosion of the sandstone banks led to silting up of the French drain and consequent flooding of the motorway. GREENFIX PRE-SEEDED COVAMAT was installed giving immediate erosion protection, grass establishment and a clean drain.



Greenfix mats can also be manufactured with jute netting and stitching in place of the polymer grid. Although the jute material will breakdown more quickly than a polymer net, a totally biodegradable solution can be offered where conditions dictate.

Features

Up to 10mm of a dense natural fibre matrix that allows water to percolate.

Informally arranged fibres with air spaces and moisture-retaining mulches.

Mats seeded during manufacture with the seeds of your choice.

Un-seeded mats for overlaying broadcast seeds.

Choice of polymer or jute mesh as outer layer sandwiching the inner biodegradable matrix.

Manageable roll sizes and weights.

F3 fire resistant.

Benefits

Erosion causing energies are absorbed while offering instant 100% soil protection. Can be laid in running water trapping sediment fines.

Seeds and indigenous plants can establish from within and below the matting, generating a natural range of plants.

Seeding and erosion control in a single operation.

Mulching effect of the matting improves all-year round establishment.

Choice between medium-term reinforcement of surface root matrix or a totally biodegradable system.

Mats can be placed manually, often concurrently with the soiling operation. They are simple to install and especially valuable for awkward situations.

Grass seed mixes & fertiliser

Greenfix Covamats are manufactured with the grass seed included. Because these materials are used in almost every situation imaginable, we have developed a range of grass mixes which will tolerate a multitude of conditions.

- Salt resistant
- Wild flower
- Poor soils
- Rapid establishment
- D.O.T.
- Wetland

These mixes can also be ordered separately and Greenfix can offer professional advice as to the correct seed mix to suit your application.

Standard seed blends (non-standard mixes also available):

- 1A*:** Rapid establishment and hard wearing; also salt resistant dyke/coastal shore mix.
- 2A*:** Standard fresh and moist ground, low - maintenance, strong root development, good erosion protection also salt resistant.
- 2B*:** Dry stony ground, strong root development, salt resistant.
- 1C*:** As per seed mix 1A but with additional clover for poor soil conditions, good all purpose mix
- 2C*:** As per seed mix 2A but with additional clover for poor soil conditions.
- Pioneer*:** Broad range of seeds to tolerate very poor soil conditions and where establishment will be difficult.
- DOT*:** Department of Transport mix, good general purpose mix specifically for roadside applications.
- Wildflora:** Wild flower and grass mix will thrive in poor soil conditions. Adds variety to a seed mix to improve diversity. Slow to develop and should be used with other mixes (10% of weight).
- Low sun:** Adapted for shade, low fertility prone areas. Low maintenance.
- Paver:** Good erosion protection capabilities, ideally suited for grass paving blocks.

**All seed also available in 25kg bags*

Fertilisers

*Greenfix Covamat plus range is now available with a unique organic slow release additive which provides soil improvement and an important nutrient source for the new seed. Once the Covamat has been laid and hydrated, the natural trace elements and vitamins are slowly released. **Covamat plus organic fertiliser is only available with the Covamat blankets.**

Benefits of Covamat plus fertiliser

- Neutral pH
- Stimulates rooting
- Contributes to humus formation
- No salting
- No over fertilisation
- Organically bound nitrogen
- Can be used all year

***24/12 fertiliser.** Standard general purpose fertiliser in 25kg bags to be spread at a rate of 60kg/m². 9-7-7 fertiliser can be used all year round and is an ideal pre-seed blend.



Pyramat - High performance turf reinforcement mat

Pyramat is a three dimensional synthetic composite matrix to provide permanently enhanced erosion protection and stability.

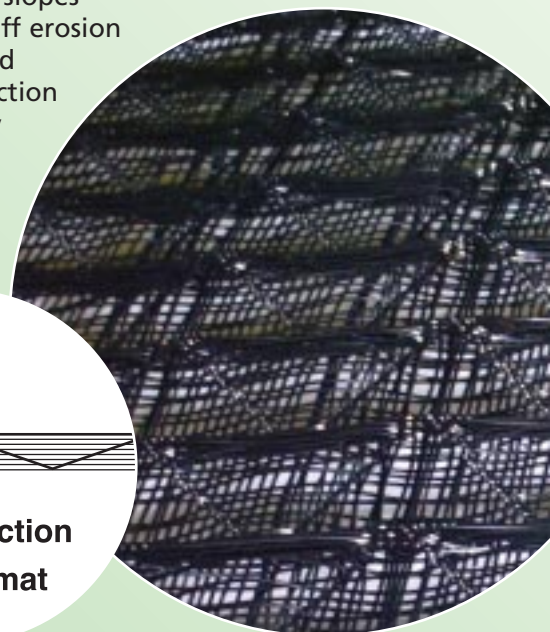
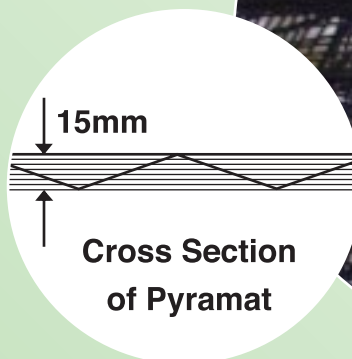
Its unique weave creates a highly effective uniform configuration of resilient pyramid-like projections that makes Pyramat unrivalled for high wear erosion protection. Pyramat exceeds the vegetal reinforcement capabilities of conventional bio-technical materials and combines the long term strength, dimensional stability, durability and functional longevity of a high performance geotextile.

Uses:

- Stream bank and shore line stabilisation
- Landfill slopes and channels
- Wrapped face slopes
- Coastal and cliff erosion
- Inlet/outlet and spillway protection
- Grass pathway reinforcement

Specification

Roll size: 2.59m x 27.43m (71.06m²)
Weight: 510gsm (Roll weight 40.4kg)
Thickness: 15.2mm
Tensile strength: 55.0 x 41.0kN/m
Ground cover: 85%
UV resistance @ 1000hrs: 90%



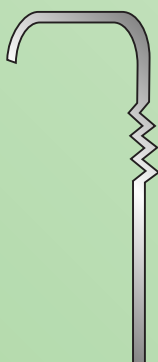
Fixing Solutions

Correct installation and fixing procedures are equally as important as the material selection. Greenfix offers a comprehensive range of fixings that will cope with

any problem and also manufactures non-standard pins to cover any requirement.



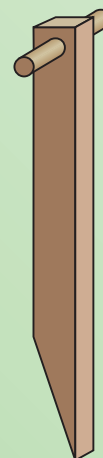
190mm, 145mm or 95mm long biodegradable biopegs for strong pull out resistance in sandy clay or loam soils



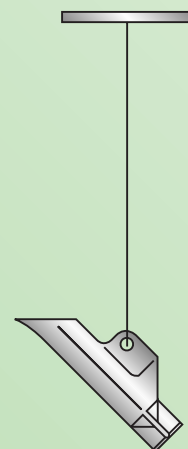
200mm, 300mm or 400mm wire pins with unique crimp for additional grip.



300mm re-bar pin for heavy duty applications.



300mm long timber pegs provide excellent grip in sandy or loam soils.



Duckbill geotextile anchors.

Greenfix Mulchmat - Weed control & mulching for the rapid establishment of shrubs and trees

Where landscape planting is required, particularly on slopes, Greenfix Mulchmats provide **mulching, moisture control, non-chemical weed control, soil erosion protection and soil temperature balance** in one single operation. Nursery-like conditions can be achieved easily and by environmentally friendly means. Greenfix Mulchmats enhance growth without the need for further mulching, chemicals or large scale maintenance.

The natural upper layer blends with landscaping, protects the bottom membrane from ultra-violet light, controls water shed from gradients and regulates soil temperature.

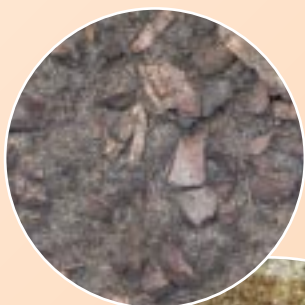


The bottom membrane prevents loss of moisture, controls erosion and provides non-chemical control of weeds. The bottom membrane is manufactured from biodegradable plastic.

Mulchmats provide weed control and mulching typically for at least 3 years.

Matting is available in rolls or squares.

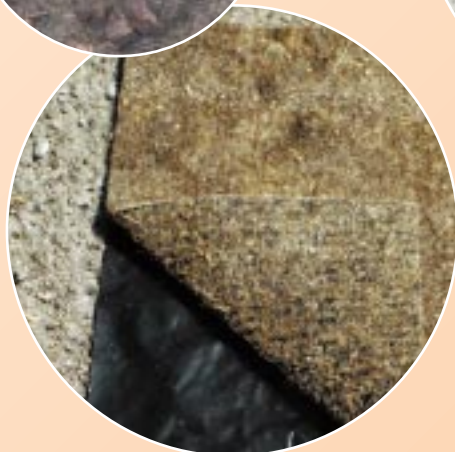
Greenfix Mulchmat
Type 9 (with
bio-degradable
bottom
membrane)



Greenfix
Bark
Mulchmat



Greenfix
Mulchmat
Type
W670DF



Planting scheme
using Type 9
Mulchmat and
Tubex guards



Product ranges

- Type 9 upper matrix robust coir fibre.
- Type 9F with fire-proof fibres.
- Type W670DF of upper layer manufactured from brown colour wool and other natural fibres fire tested to BS6807, 1990, cigarette and match test.
- Type W670B with additional bark mulch upper layer for improved aesthetics.
- Type W450SF for economy planting schemes (lasts for 2 years).

Other planting products available:

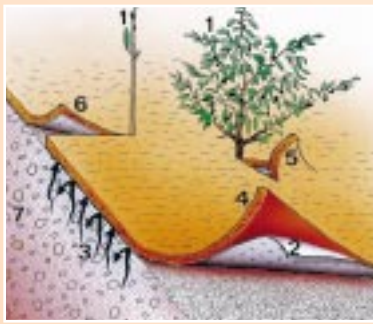
Rootball anchor kits
Tree/Rabbit guards

Filling station development -
Merryhill Centre,
West Midlands
10,000 m² of
planting through
Mulchmat Type 9.
Photo taken after one year



Reinforced
bund with
Mulchmat
surface
protection to
promote rapid
plant growth

Mulchmat Example



1. New plants.
2. Photodegradable polypropylene membrane with percolation holes providing full weed control.
3. Soil moisture retained.

4. Attached 7mm natural-fibre matrix permits solar heating of soil and subsequent heating-retention for maximum growth rates.

5. Plant insertion by flap method.

6. Plant insertion by edge method.

7. Protected soil.



No need for Chemicals!



Avon Ring Road Mulchmat trial (shown on the right) against polythene spats (on left)

Features

EROSION CONTROL: To prevent soil erosion.

MULCHING: Special membrane prevents moisture loss but allows water into soil.

WEED CONTROL: Backing membrane smothers unwanted plants and prevents weed germination.

SOIL TEMPERATURE: Mats with 7-10mm thick quilted construction.

SOIL FERTILITY: The biodegrading upper layer is separated from the soil by a membrane.

NEGLIGIBLE MAINTENANCE: Biodegradable over-layer and photodegradable backing membrane.

SPECIFICATION: Easy to specify accurately and available in roll widths or square sizes to suit the planting scheme.

USING W670

ECONOMICAL: Easy to install. No special labour.

Benefits

Less plant stress and very low plant losses.

Non-chemical weed control for many seasons.

Allows solar radiation to raise and maintain the soil temperature for fast growth.

Avoids nitrogen sink effect experienced with bark mulches.

No need for aesthetic coverings, topping up or frequent visits.

Simple to check that correct material has been supplied. Size ensures economical use.

For use where risk of accidental fire is of concern.

Low installation and maintenance costs.



2 years after planting



Composite soil erosion control engineering

Rockmat

Combines the benefits of Eromat with additional steel reinforcement.

Uses:

- Chalk and rock slopes
- Temporary cuttings
- High energy erosion area
- Windy sites
- To prevent burrowing vermin

Manufactured from (coir/straw and F3) fibres with a choice of Galvanised or PVC coated hexagonal twist steel wire.

Greenfix Rockmat provides additional long term support and protection to vulnerable slopes.

Superb vegetation establishment is possible due to the Eromat blanket shielding young seedlings and face reinforcement ensures slope face degradation from water run off or frost heave is prevented.

Rockmat provides a highly effective anti-vermin protection layer where rabbits and foxes, etc. are likely to create slope instability due to burrowing. Rockmat is available with coir fibre or coir/straw fibre matrix. Coir fibres will last 3-5 years.



Vegetation Mat

Water Sewage Treatment Works, Devizes. Vegetation Mat over HDPE lining.



Courtyard Landscape Scheme, Cheltenham. Used over an existing concrete base.

Vegetation Mat is a unique multi-layered soil filled blanket. Greenfix Vegetation Mat allows provision of a soil layer onto clay or rock slopes that have little or no natural soil. Ideal for use on polythene liners to encapsulate soil and promote vegetative growth.

Vegetation Mat can be supplied pre-planted with grasses or sedums (see Greenroof section). Manufactured from a fleece bottom layer and coir upper layer and stitched together with medium duty polypropylene netting.

Green roofs and terraced areas can be vegetated and enhanced using Vegetation Mat (see Greenroof section). Vegetation Mat provides lightweight and effective vegetative cover and is quick and simple to install. Available with 10, 20 or 30mm of soil as standard.

Benefits

- Quick and simple to install.
- Soil encapsulated preventing wash out and mess.
- Pre-seeded for quick establishment.
- Heavy duty manufacture prevents erosion and soil loss and protects vegetation.

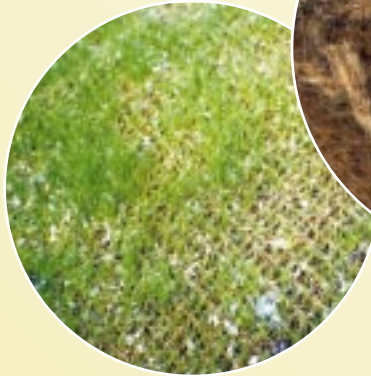
Embankment Mat

Greenfix Embankment Mat provides the erosion benefits of Covamat and Eromat with the strength and durability of Geocoir Net.

Manufactured using coir bristle fibres Embankment Mat can withstand more aggressive erosion factors.

Ideal for use on watercourse embankments or for soil reinforcement of footpaths and access tracks.

Embankment Mat can be supplied pre-seeded or un-seeded and is available with either 400 gram or 700 gram coir net.

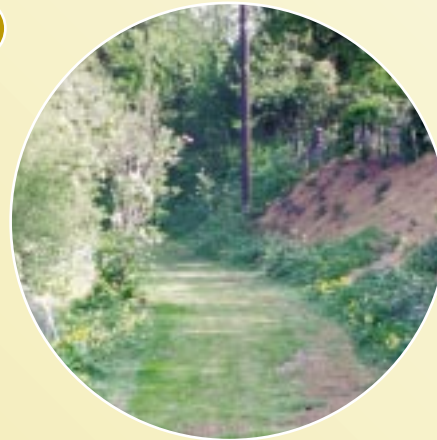


Embankment Mat



Benefits

- Effective soil reinforcement.
- Totally biodegradable.
- Strong spun coir weave capable of reinforcing soil thickness in excess of 400mm.
- Simple and cost effective to install.
- Prevents soil movement allowing successful vegetation establishment.



Embankment Mat for pathway reinforcement

Grass Paving

Greenfix has developed a range of Grass paving systems, loam mixes and grass seed blends to provide a comprehensive solution for Green paved areas. Pathways, car parks (temporary and permanent), wildfowl feeding areas and Greenroofs can all be enhanced by using a strong environmentally friendly alternative to hard concrete or tarmac surfaces. Greenpaving has been successfully used on areas such as national parks where additional parking is required without leaving a scar on the landscape and where the reduction on visual impact is paramount.

Greenpaving does not require surface drainage and is a recognised Sustainable Urban Drainage System (S.U.D.S.)

The success of this type of scheme is dependent on the long term establishment of vegetation. Greenfix has developed a specific loam mix that gives nourishment to the grass whilst allowing water to drain through. Our loam mix also prevents the soil becoming over compacted. By monitoring the performance of our installations we have shown that using correct growing medium as well as adhering to the construction details gives long term service life of our grass paving systems.



Grass Paving, Gloucester Cathedral



Grass Paving, Bromsgrove

Watercourses and aquatic engineering



A whole range of Greenfix products are used extensively for revetment protection, vegetation establishment and enhancement and watercourse reconstruction works.

Frequently several products are used in conjunction where a scheme has several factors influencing the problem.

A30 Honiton Bypass where over 4 km of ditch lining was carried out using Greenfix Covamat.

Bio-rolls and Bio-pallets

Greenfix Bio-rolls and Bio-pallets installed alongside vulnerable streams, rivers or other watercourses provide a botanical solution to protect against scour erosion whilst allowing water marginal plants to develop longer term natural protection and rapidly increase the diversity of flora and fauna to the area.

- Bio-rolls and Bio-pallets are manufactured from 100% coir fibres.
- Can be supplied unplanted or preplanted as necessary with local indigenous species grown to order. Alternatively aquatic plants can be placed in-situ once the rolls and pallets have been installed.

- Bio-rolls can be supplied in a variety of diameters with 300mm being the standard size. Rolls can be stacked to provide greater protection against fluctuating water levels.
- Bio-pallets are manufactured in a pad size of 1.25m x 0.80m x 0.1m thick. Other sizes available on request.
- Bio-rolls and Bio-pallets are quick and cost effective to install using wooden stakes or steel pins to fix into position.



Uses

Used by the Environment Agency, developers, landscapers, Local Authorities and Wildlife Trusts, etc. Bio-rolls and Bio-pallets provide the most simple, yet effective, solution for vegetation establishment and erosion control to watercourse edging. In conjunction with our range of pre-seeded and un-seeded erosion products and revetment systems, Greenfix are able to offer a comprehensive, evaluation, design, supply and build service for biotechnical and bioengineering solutions.

Plant Supply

Greenfix can supply all British nature reeds and marginals direct to site.

River Severn tidal estuary, Gloucestershire. Greenfix Eromat protecting new works from the Severn Bore wave.





Sainsburys, Sevenoaks using Bio-pallets and Bio-rolls to establish vegetation and control sediment build up.

Greenfix Bio-cores

250mm diameter x 2.0m long recycled card cores, filled with coir and soil fibre mix.

Bio-cores can be pre-planted with a selection of native marginal plants and reeds. Greenfix can advise on suitable plant species.

Bio-cores offer a strong and simple to install, cost effective method of establishing vegetation on a watercourse embankment.



Lintobent

Lintobent clay liner is a three layered biocomposite for use in lining ponds and lakes, landfill base lining and covers, and for groundwater protection where an impermeable liner is required.

It is manufactured from a strong woven geotextile base layer, a fibre reinforced sodium bentonite clay middle layer, with a spun fibre geotextile upper layer. The high quality bentonite clay is characterised by a high swelling capacity and extremely low permeability. Bentonite clay absorbs water from surrounding soil to hydrate and this then forms a secure seal. Over swelling of the clay is restricted by the cover material keeping the thickness of the liner low.

Specification
Weight; 4300gsm
Thickness:
 Approx 7mm
Roll length: 35m
Roll width: 5.0m
Roll weight: 800kg



Aqua-hab/Vole-hab

Manufactured from treated soft wood or green oak, Aqua-hab and Vole-hab provides a safe habitat for voles and invertebrates for shelter and breeding.

The unique structure of these Habs allows for replacement of the riverbank without compromising the stability of the watercourse edge.



Floating Reed beds

Greenfix floating reed beds are a modular system that can be connected together to suit site requirements.

Our Reed Beds are designed to withstand impact from boats and floating debris that break air filled tubular systems.



Willow revetments

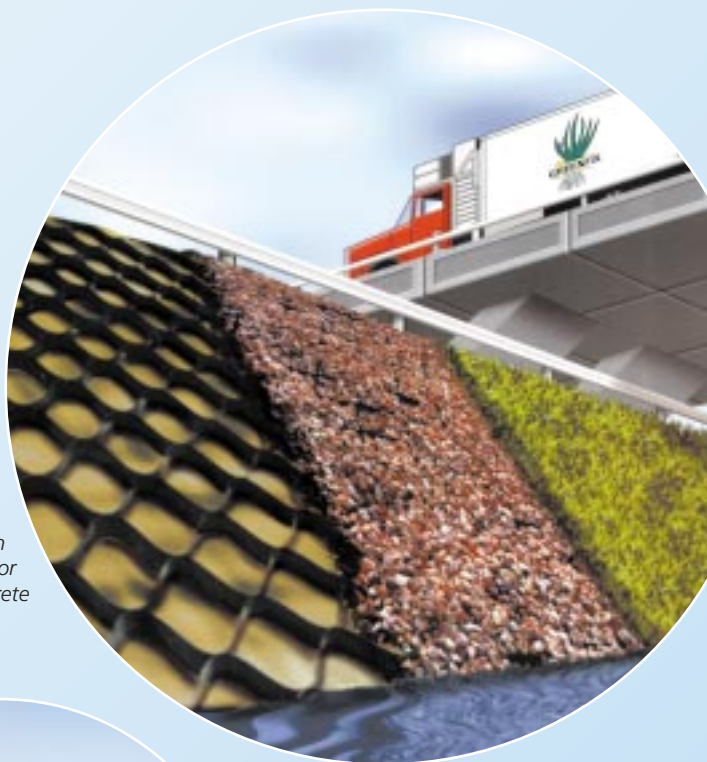
Willow provides an excellent alternative to traditional hard landscaping or engineered solutions where rock and concrete are being considered.

Willow is a biomass crop and cuttings can be used for other repairs etc. Willow can enrich a rivers habitat and is suitable for a wide range of projects including SSSI and conservation sites.



Soil-Cell- Soil reinforcement

- **3D Cellular soil reinforcement**
- **Manufactured from HDPE**
- **Ultrasonically welded**
- **35 Specifications available**



Soil-Cell
can be
fitted with
soil, stone or
concrete



General
embankment
reinforcement
Slough



Haul road
reinforcement
reduces hardcore
thickness



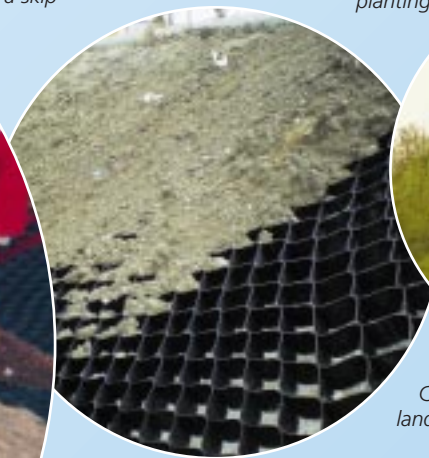
Enstowe
Manor
embankment
vegetation



Concrete
farm access
reinforcement



Amersham, Bucks.
Poor access meant
soil was placed
using a skip



3 years after
planting

Chalk face
landscaping, Kent

Greenfix Soil-Cell is a unique cellular reinforcement and confinement system.

Soil-Cell can be manufactured to specific requirements.

Soil-Cell is highly effective in encapsulating soils and aggregates to prevent migration of materials and is particularly beneficial in preventing soil erosion and failure on steep slopes and embankments.

Manufactured from high density polyethylene strips, Soil-Cell is ultrasonically bonded to form a strong yet lightweight and flexible three dimensional honeycombe structure. Soil-Cell can increase material shear strength reducing fill requirements by up to 50% and its cellular structure can improve soil bearing capacity up to 17 times.

The special feature of the Greenfix Soil-Cell system is the range of cell sizes and depths available which gives engineers the flexibility and the increase in design parameters required. Greenfix Soil-Cell is the only system that has a small enough cell size to allow use on slopes with an angle of up to 60 degrees.

Quick and simple to install, Greenfix Soil-Cell can be used for:

Embankment stabilisation

Road and rail construction

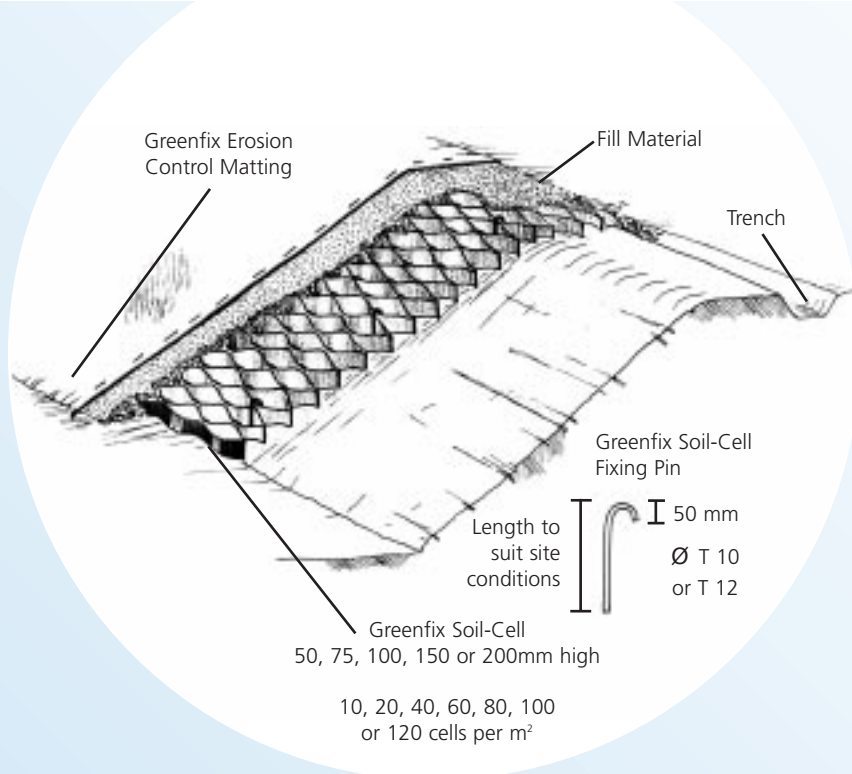
Water courses

Armouring

Footpaths

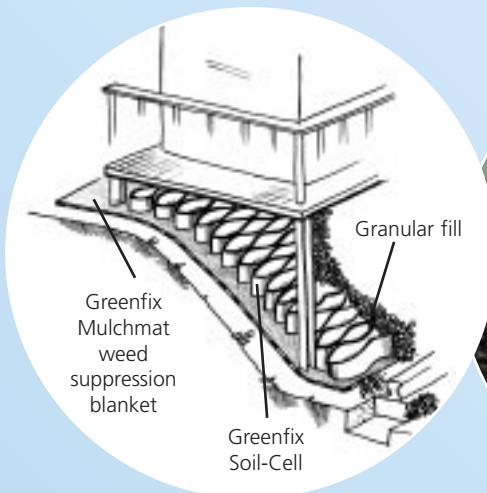
Plastic liner covering

Retaining walls



Soil-Cell Quality Specifications

No.	Properties	Required Value					Test Method		
1	Material	HDPE							
2	Density (g/cm ³)	>0.945					ASTM D-792 UNE 53 020 (A)		
3	Carbon Black Content %	2 - 3					ASTM D 4218		
4	ESCR -Environmental Stress Crack	>1500					ASTM D 1693		
5	Wall thickness (mm)	1.0 (+/-5%)					ASTM D 751 UNE 53 213-2		
6	Ultrasonic	Full Ultrasonic welding							
7	Cell height	50	75	100	150	200	ASTM D4545		
8	Minimum seam peel strength (N)	500	710	1000	1420	2000			
9	Strip length (m)	4.5							
10	No. of strips per Unit	50							
11	Cells per (m) ²	10	20	40	60	80	100	120	
12	Width of individual expanded cell (mm)	484	340	243	200	170	154	141	
13	Depth of each expanded cell (mm)	404	283	203	167	149	129	118	
14	No. of welded points on each	8	11	15	18	21	23	25	
15	Length of expanded unit (m)	10.10	7.08	5.08	4.175	3.55	3.23	2.95	
16	Width of expanded unit	3.43							



Recultex- Soil reinforcement

Recultex provides a natural solution to prevent slippage of topsoil whether on oversteepened slopes or where the rock or subsoil to soil interface has poor frictional qualities. Manufactured from 100% spun coir fibres (with an anti-fungal treatment), Recultex will provide several years of protection whilst the root matrix develops to bind the soil and give long-term stability. Use in conjunction with Mulchmat or Covamat for maximum protection.

Roll size:
150 or 200mm high (greater if required)

Roll length:
50m

Weight:
0.9kg/m²

Tearing strength:
Dry 6020 N Wet 5070 N

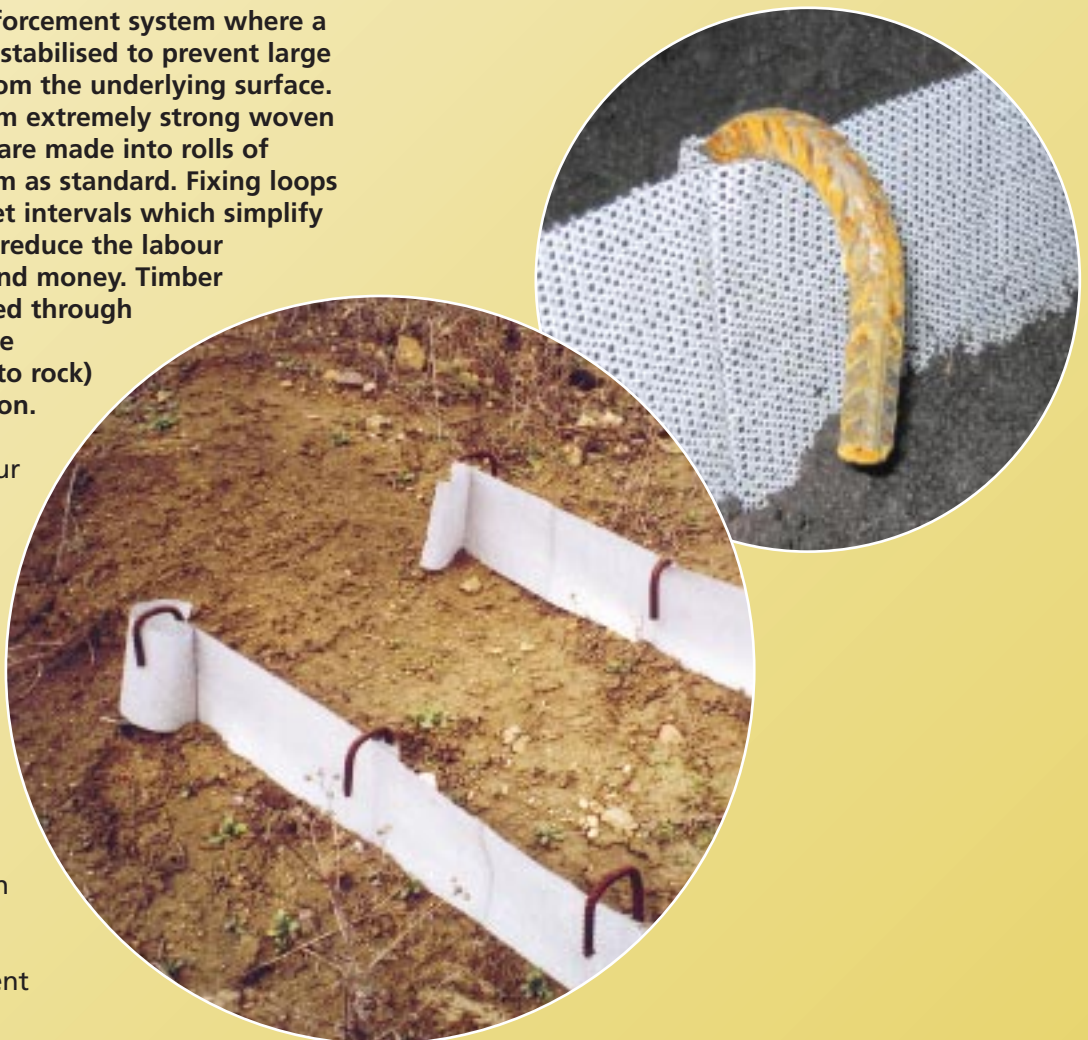


Polytex

Polytex is a unique soil reinforcement system where a layer of topsoil needs to be stabilised to prevent large scale slipping or shearing from the underlying surface. Polytex is manufactured from extremely strong woven polypropylene fibres which are made into rolls of varying heights up to 500mm as standard. Fixing loops are double stitched at pre-set intervals which simplify the installation process and reduce the labour requirements, saving time and money. Timber stakes or steel pins are placed through the loops and driven into the underlying soil (or drilled into rock) to hold the Polytex in position.

Polytex has similar uses to our biodegradable material Recultex but the flexibility of manufacture allows Polytex to be used on slopes up to 50 degrees with the soil being placed in 1 layer for thicknesses over 200mm.

Polytex allows moisture and plant roots to migrate from cell to cell as well as keeping the soil stable which helps plants develop a strong root system that will eventually give the permanent reinforcement required.



Geocoir & Geojute®

Geocoir

Manufactured from 100% high quality bristle coir fibres, Geocoir erosion control netting is produced from spun coir twine and is available in two grades, 700 gram and 900 gram. Both materials provide a strong and durable short to mid term protection with an anticipated decomposition longevity of over 5 years. Geocoir is available in larger rolls if required, however consideration must be given to roll weight and handleability.

Name

Technical Specification

Uses

Geocoir 700

Manufactured from 100% bristle coir fibre
 Warp threads Approx. 110 per m
 Weft threads Approx. 70m per m

Area	40m ²
Width	2m
Length	20m
Weight	28kg

Geocoir 900

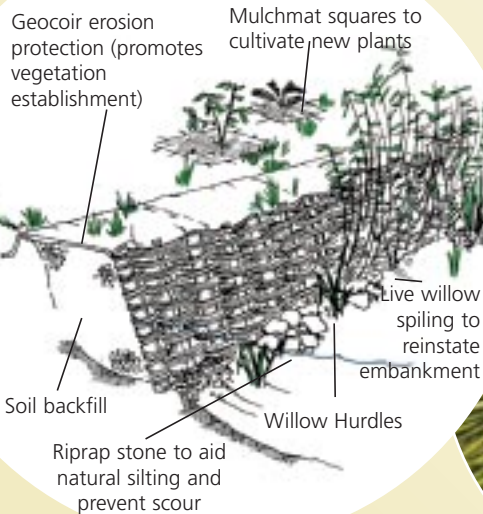
Manufactured from 100% bristle coir fibre
 Warp threads Approx. 110 per m
 Weft threads Approx. 70m per m

Area	40m ²
Width	2m
Length	20m
Weight	36kg

EROSION PROTECTION TO:

- Newly cut slopes
- Top soiling on slopes
- Landfill cappings
- Watercourse lining
- Soil reinforcement
- Sediment entrapment
- Sand dune stabilisation
- Ground abrasion protection

TYPICAL APPLICATION



Geojute®

Manufactured from unbleached jute fibre, Geojute® is a lightweight yet effective net for use in the prevention of erosion. Geojute® will typically degrade in one season and is used where short term protection is required.

Geojute® holds up to 5 times its own weight in water and when used in conjunction with hydraseeding can be invaluable for the establishment of new grass seedlings.



Technical Specification

Width	1220mm + / - 25mm.
Weight	500g.s.m. + / - 50g.
Warp threads	63 per m. approx.
General yarn weight	4300 Tex
Natural "Dry" moisture content	10-20%
Roll length	41 metres

Material: 100% unbleached jute fibre
Percentage open area: 60% approx. overall
Fixings: 8 gauge wire staples typically 150mm long, or 200mm long as conditions require. Minimum 1 staple per square metre.



Greenfix greenroof systems

Sedum roof

Meadow roof

Brown roof



A Greenroof is a vegetative layer placed on top of an existing or new roof system. The vegetation can be provided by various materials such as grass, shrubs or low maintenance Sedums. A Greenroof may also incorporate features such as planters, statues and seating etc. The hard landscape element is described as Brownroofing.

Apart from the visual benefits of a green, vegetated or living roof, there are many additional and environmental advantages:

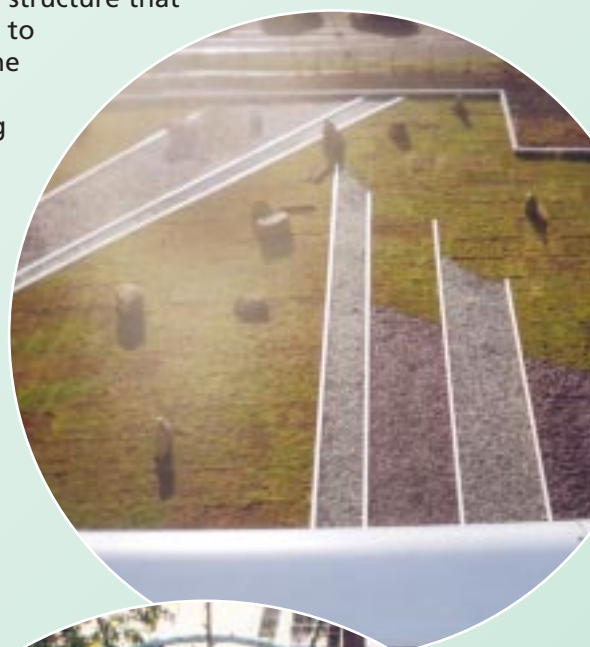
- Control storm water run-off by intercepting and delaying run-off and storing water in plant foliage, absorbing it in the root zone and slowing the run-off velocity.
- The service life of the roof will be extended due to shielding from ultra-violet radiation, insulating from extremes of temperature and minimising the daily expansion and contraction of roof materials. Any mechanical damage from wind blown debris and pedestrian traffic will be reduced.
- Additional insulating properties of a Greenroof will lower energy expenditure and help purify the air. The urban Heat Island Effect can be mitigated due to the use of Greenroofing materials.
- During summer months cities can be up to seven degrees hotter than surrounding areas, becoming incubators for smog, threatening public health and creating greater energy demand due to air conditioning etc. The heat absorbing properties of pitch and other dark roofing materials are reduced when plants and grasses are introduced.)
- Noise levels can be reduced within buildings due to the introduction of an additional layer of insulation as well as the sound deflection properties of vegetation.

What can Greenfix offer

Working with some of Europe's leading exponents of living roof design and construction, Greenfix has developed a range of materials to suit almost any roof structure and has systems to deal with both **Extensive** (lightweight, lower cost and lower maintenance) and **Intensive** (generally thicker growing medium layers)

heavier structure and more costly, although more suitable for dramatic landscaping schemes) Greenroof applications.

Greenfix provides a design and installation service as well as technical assistance to ensure that the correct selection of drainage layer, growing medium and vegetative material is used. The combination of these layers, as well as the provision of a suitable root barrier that may be needed is essential to provide a living addition to a structure that will continue to provide all the benefits that Greenroofing can offer.



Technical details

Root Barrier:	ReRoot 2000 1mm thick high strength membrane
Rolls:	1m wide
Drainage:	Drenimat (low volume) Geovoid (high volume)
Growing Medium:	Meadowloam (loose loam) Biodrain (light structure) Vegetation Mat (medium weight)
Vegetation:	Sedum blanket Geoturf Shrubs

Greenfix Sedum blankets use 14 types of plant to ensure that a diversity of species will colonise the roof and will provide an all year round interest.

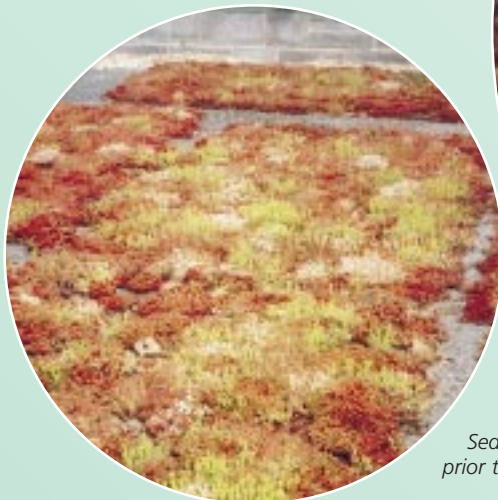
Greenfix Geoturf is a soil-less reinforced turf that has reduced weight making installation easier. The Geoturf is grown through a geotextile grid to increase strength and erosion resistance.



*Terrace garden
Brown roof,
London*



*Biodrain with
pregrown sedum
blanket and
sedum
strata*



*Sedum Blankets
prior to installing*

We offer a unique service providing solutions for erosion control and vegetation establishment.

We provide a design, supply and installation service to complement our comprehensive range of bio-degradable products and we have many years of unrivalled expertise that has resulted in the range of high quality services and materials that we can now offer.

Greenfix has also developed close working ties with a range of associated companies including consulting engineers, soil nailing and ground anchor experts, geotextile merchants and environmental consultants, to enable us to provide a total solution to our customers. Our end users cover all sectors of the construction industry including housing, motorway, railway, industrial/commercial, water and landscape schemes.

Greenfix - environmental solutions

EROSION CONTROL AND SOIL STABILISATION SYSTEMS

SOIL REINFORCEMENT ●

ANTI EROSION TEXTILES ●

AQUATIC ESTABLISHMENT ●

CHEMICAL FREE WEED CONTROL MULCHMATS ●

GREEN ROOFS ●

GREENFIX

ENVIRONMENTAL SOLUTIONS

Cheltenham



01242 679555



01242 679855

Stockton



01642 888693



01642 888699



Produced using materials which are environment friendly. Timber from renewable and fully sustainable resources. Pulp bleaching processes are Elemental Chlorine Free. Suitable for recycling.



Link-up
Supplier Number: 20425

Greenfix is Network Rail (Link-up) approved and working towards ISO approval. Greenfix is committed to pioneering the use of biodegradable materials.

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