



**Introducing a revolution in drainage technology**





**POLYBED<sup>®</sup>**  
**DESIGNED FOR DRAINAGE**

## **Polybed - The SUDS solution**

The Polybed System encompasses our understanding of SUDS by offering a more cost-effective and sustainable solution to traditional drainage by utilising recycled polystyrene geosynthetic aggregate in place of natural quarried aggregates. The resultant benefits are an extremely lightweight system that can be rapidly installed without the need for specialist skills.

The Polybed System stands apart from the usual 'deep geocellular box' SUDS system solutions and the heavy traditional chamber systems in many ways. Flexibility, for a start - it can bend around most fixed objects unlike boxes and chambers. Plus the light weight eliminates the usual physical and mental stresses associated with many drainage installations. Requiring only the manpower of one or perhaps two personnel for a typical installation, it doesn't require specialist skills.



# Changing the landscape of drainage

## **SUDS the need for sustainable drainage**

SUDS is an abbreviation for Sustainable Drainage Systems; meaning a drainage system designed to offer maximum protection from flooding caused by substantial amounts of rain falling rapidly on developments whose surfaces are built from impermeable (water-resistant) materials such as concrete, tarmac, tiles etc.

Nationwide incidences of rapid, successive rainfall leading to localised flooding are becoming commonplace with pictures adorning the front page tabloids or headlining the evening news, but it isn't the rainfall causing the problem, merely the lack of a means for it to disperse without disruption.

The products used in traditional drainage applications amplify the problem as they act purely as vessels to transport the rainfall from one place to another without any consideration for volume. Therefore, when the volume becomes unmanageable the flooding occurs.

In contrast, the products used within SUDS applications comprise a series of clever techniques devised to imitate the natural drainage process by slowing down the volume of rainfall and then slowly releasing it into the rivers to minimise the occurrence of flooding.

SUDS also comprise water quality techniques that can be used to help combat river pollution. This can be caused by increased surges of floodwater washing into the river via watercourses containing pollutants such as fine dust, rubber particles, oil and grease that are captured in the run-off from impervious surfaces.

## **Source Control - The primary SUDS technique**

Source control is the control of stormwater runoff at or near its source; it is recognised as the primary technique in achieving a SUDS solution. The stormwater management train principle utilises source control by following the natural pattern of drainage as this minimises the problems associated with traditional drainage design by controlling runoff where it is generated and returning it promptly to the natural environment.

Infiltration of stormwater back into the ground is the fundamental method of achieving source control and, if possible, should be utilised on all development sites.

The Building Regulations (Part H) now state that whenever possible infiltration should be the method for discharging stormwater. This is further endorsed by The Environment Agency and SEPA; both of whom are committed to this highly effective source control technique.

## System Information

The Polybed System comprises a geosynthetic aggregate (known as EPS aggregate) manufactured from recycled expanded polystyrene, engineered for optimum performance with consistent form, surrounding a 3 metre length of standard diameter perforated pipe encased in polythene netting that is clamped to both ends of the pipe. The finished product has an overall diameter of 300mm. For SUDS applications The Polybed System is supplied encapsulated with a non-woven needlepunched geotextile layer which offers enhanced infiltration and reduces the risk of long term clogging.

The 3 metre long Polybed sections are simply joined together by the use of proprietary couplers creating a rapid click fit connection that is protected by a preformed Polybed collar.

Also available in similar 3 metre x 300mm diameter sections are the Polyagg Bundles (without the perforated pipe), which can be used in conjunction with the Polybed as lightweight fill to increase the void and achieve additional storage.

## System Features and Benefits

The design of The Polybed System enables storage and flow characteristics that typically achieve 35% more surface area than natural aggregates: resulting in enhanced water treatment capabilities and a reduction in long term clogging.

The overall performance of The Polybed System provides many benefits including the potential for a reduction in the total length of installation - other key benefits are:

**Cost** - The totally prefabricated Polybed System can be installed up to 4 times quicker than a traditional solution and typically requires only one operative and minimal plant

**Weight** - Extreme lightweight increases handling capability and reduces Health and Safety hazards

**Sustainability** - The use of recycled waste materials makes The Polybed System a much more sustainable solution minimising the ongoing damaging impact on our environment

PART NO.	PRODUCT	DESCRIPTION	WRAPPING	TYPICAL APPLICATION
FD1230	Polyagg Bundle	300mm x 3m Lightweight fill	Net	All applications
FD1231G	Polybed	300mm x 3m Single wall corrugated perforated pipe	Geotextile	Sub surface drainage fields, soakaways, french drains and filter infiltration drains, land drainage for subsurface irrigation and infiltration systems, foundation and retaining wall drainage systems
FD1232	Polybed	300mm x 3m Twin wall unperforated carrier pipe	Geotextile	Unperforated carrier pipe for all applications
FD1233	Polybed	300mm x 3m Twin wall perforated pipe	Geotextile	Perforated pipe for all applications
FD1233	Polybed	300mm x 3m Twin wall perforated pipe	Net	Septic tanks and bio-treatment plants
FD1206	Polybed Collar	300mm EPS collar surround for connecting coupler		All applications

## System Performance

The Polybed System has had the benefit of independent UK technical validation to demonstrate its superior performance compared to traditional natural aggregate solutions. In particular, BTTG (British Textile Technology Group) and EPG (The Environmental Protection Group) have undertaken a series of tests to establish the primary performance characteristics of The Polybed System.

For shallow applications The Polybed System offers a consistent void ratio in excess of 30% which compares favourably to natural aggregates that typically vary from 10%-30%.

## Flow Capacity

The high flow capacity of The Polybed System makes it a cost-effective option for stormwater soakaways and septic tank applications in comparison to traditional solutions incorporating natural aggregates.

The results indicate that the material has a permeability of between  $1 \times 10^{-1}$  m/s and 1.2 m/s at 5kPa vertical pressure, which is similar to the permeability that would be expected from 4/10 or 10/20 single size gravel.

**The versatility of The Polybed System makes it suitable for use in the following applications:-**

## Infiltration Techniques (SUDS)

As stated in Part H of the Building Regulations 'source control is the preferred option in any SUDS scheme' and infiltration should be the method used wherever possible. Therefore, The Polybed System is an ideal infiltration device due to its ability to enhance the natural capacity of the ground to store and drain water. It provides a large surface area in contact with the surrounding soil through which water can pass.

## Domestic and Stormwater Soakaways

The use of The Polybed System as a domestic soakaway provides an extremely cost effective solution as the high void ratio of 30-40% reduces the volume of excavation when compared to traditional natural aggregate soakaways. Also, it has been demonstrated that linear trench soakaways typically offer an enhanced performance over deep volume structures.

## Bio-Treatment Plants and Septic Tanks

The effluent from a septic tank is usually discharged to a drainage field through a series of perforated drains that should be laid to a gradient and are generally known as outfall drains. The Polybed System can be simply incorporated into the shallow trenches used to form the required sub-surface irrigation system.

## Sports Pitch and Golf Course Drainage

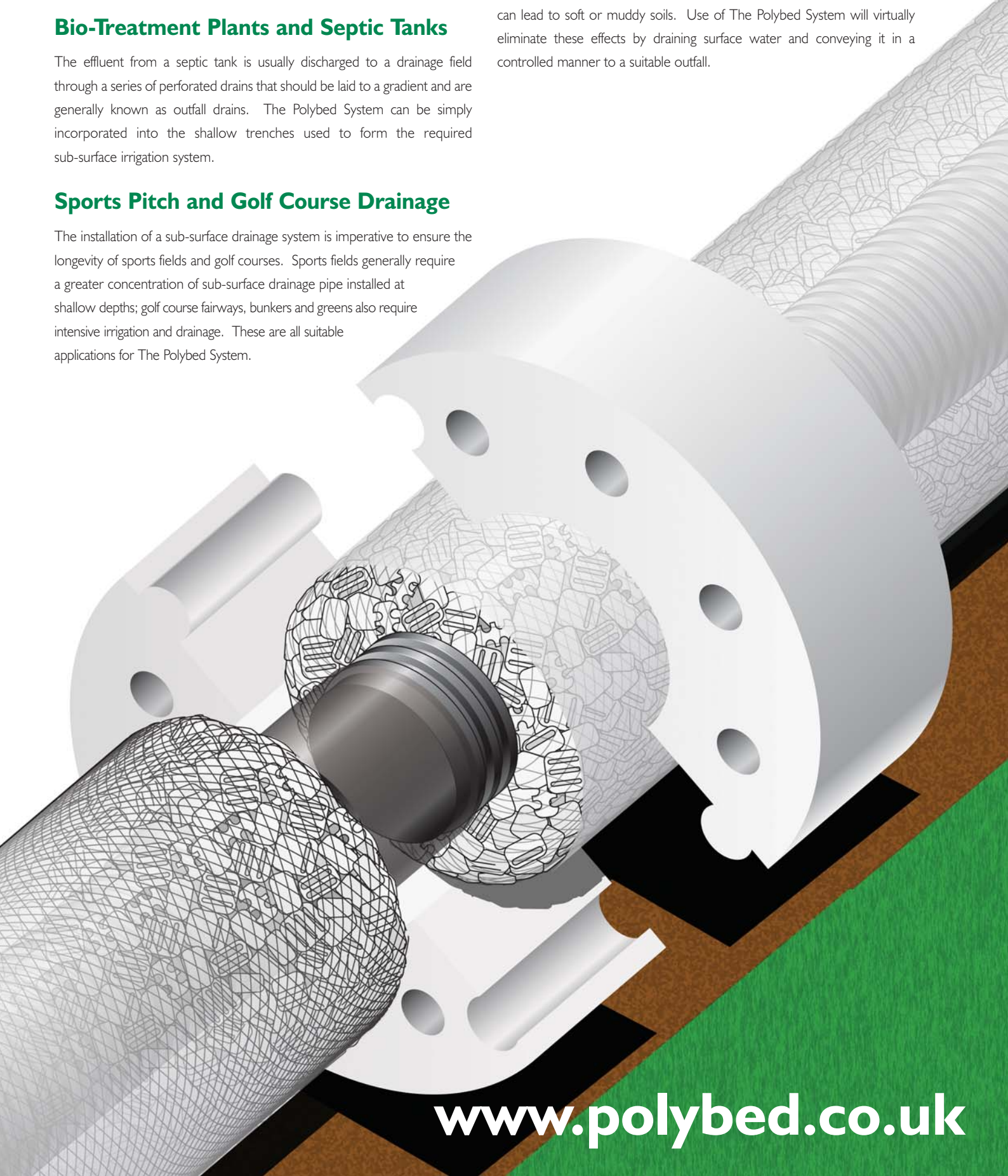
The installation of a sub-surface drainage system is imperative to ensure the longevity of sports fields and golf courses. Sports fields generally require a greater concentration of sub-surface drainage pipe installed at shallow depths; golf course fairways, bunkers and greens also require intensive irrigation and drainage. These are all suitable applications for The Polybed System.

## Retaining Wall and Foundation Drainage

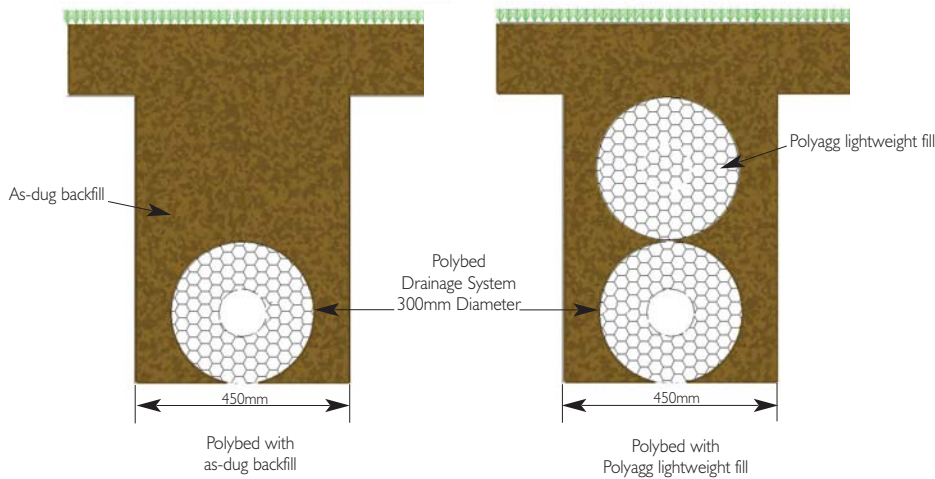
The Polybed System can be installed at the back of retaining walls and foundation drainage to prevent the build up of hydrostatic pressure.

## Land Drains

Land drainage is primarily used to lessen the effects of standing water that can lead to soft or muddy soils. Use of The Polybed System will virtually eliminate these effects by draining surface water and conveying it in a controlled manner to a suitable outfall.



## System Installation



## Installation Guidelines



Trench excavated to site specific requirements arisings kept for re-use



Polybed system installed into dug trench



Polybed system wrapped in non-woven needle punched geotextile, which is factory fitted



Arisings used to backfill to top of trench

## Case Study

This case study focuses on an in-situ trial to establish the cost of installing The Polybed System in comparison to a traditional gravel 'french drain' for a linear soakaway application.

### Stage One: Identifying an opportunity

Westbury Homes were keen to assess the benefits of The Polybed System and to facilitate this they identified their housing development at Hoo Road, Kidderminster as being the most appropriate project on which to undertake an in-situ trial.

The trial was situated in a cul de sac in the corner of the site in an area designated as public open space. Our main concern was that the trial had to be independently monitored. Therefore, we employed a specialist design consultancy with specific expertise in the design and validation of SUDS to project manage, review and report on the findings.

### Stage Two: Trial Protocol

To facilitate a direct comparison of relative installation times and costs between The Polybed System and the traditional trench, it was agreed that two 30 metre long x 700mm deep x 450mm wide soakaway trenches would be constructed.

### Stage Three: Conclusion

The trial demonstrated the following benefits of The Polybed System relative to a conventional soakaway trench:

- Up to 4 times quicker installation time
- Less labour and plant intensive
- Minimal arisings to cart off-site
- No importation of natural aggregates
- Reduced overall cost\*

\* The overall cost saving will vary from project to project and is dependent upon the local cost of aggregate and tipping charges for the excavated material.



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