



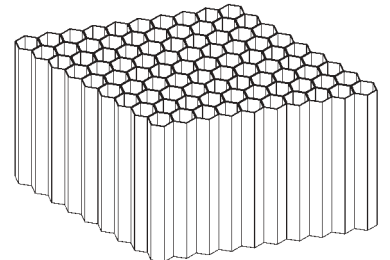
THE STORMWATER PACKAGE

**The total stormwater
management solution**

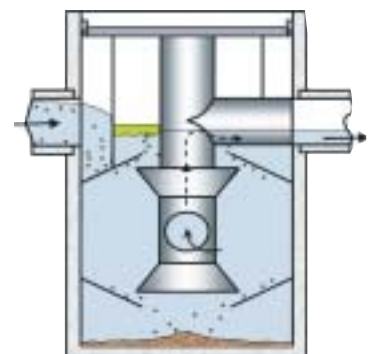
**FLOW
CONTROL**



**STORMWATER
STORAGE**



**STORMWATER
TREATMENT**



The Concept

The construction of buildings, car parks and other impermeable areas compromise the natural ability of the ground to hold water. This leads to an increase in the volume and rate of stormwater runoff, with attendant risks for developers being unable to meet Environment Agency or other regulatory controls, and having difficulty in obtaining planning permission.

Hydro's Stormwater Package offers developers a low-cost and effective way of controlling and storing stormwater as well as treatment of contaminated runoff. Hydro's products have been developed to utilise the energy inherent in water flows to operate and therefore require no power. They also have no moving parts and hence require little or no maintenance.

Sustainable Urban Drainage Systems (SuDS)

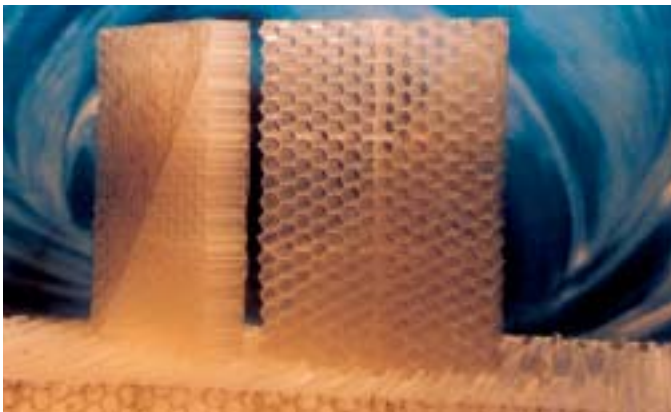
SuDS are designed to protect or enhance water quality and the environment and, where appropriate, encourage natural groundwater recharge. This is generally achieved by dealing with stormwater runoff close to where it falls as rain (source control approach) and protecting water resources from pollutants. Hydro's Stormwater Package offers solutions to the challenges provided by the design of SuDS.



Stormcell® awaiting installation as part of a rainwater recycling system on a Garden Centre.

Stormcell®

Stormcell® provides an alternative means of achieving underground storage at low cost. When used in conjunction with the Hydro-Brake® Flow Control and Hydro's Hydrological Analysis Service, significant savings over more traditional storage systems can be achieved.

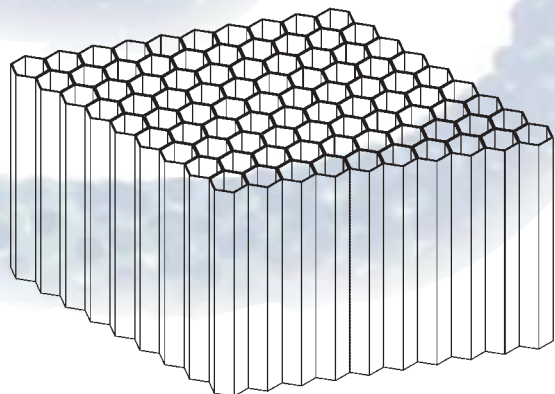


Advantages

- Very cost-competitive - cheaper than traditional storage solutions.
- Very strong (up to 40 tonnes/m²) can be installed beneath roads and car parks.
- Lightweight, quick and easy to install.
- High void ratio (95%).
- Highly flexible - optional volume size, shape and depth.
- Modular sizes - 2.4m x 1.2m in plan and between 120mm and 520mm in depth.

Applications

- Stormwater Management/Source Control:
 - ~ New and Existing Developments
 - ~ Highway Schemes
 - ~ Car Parks
- SuDs Projects.
- Land Drainage.
- Soakaways.
- Rainwater Storage for Reuse.
- Alleviation of Existing Flooding in Urban Areas.

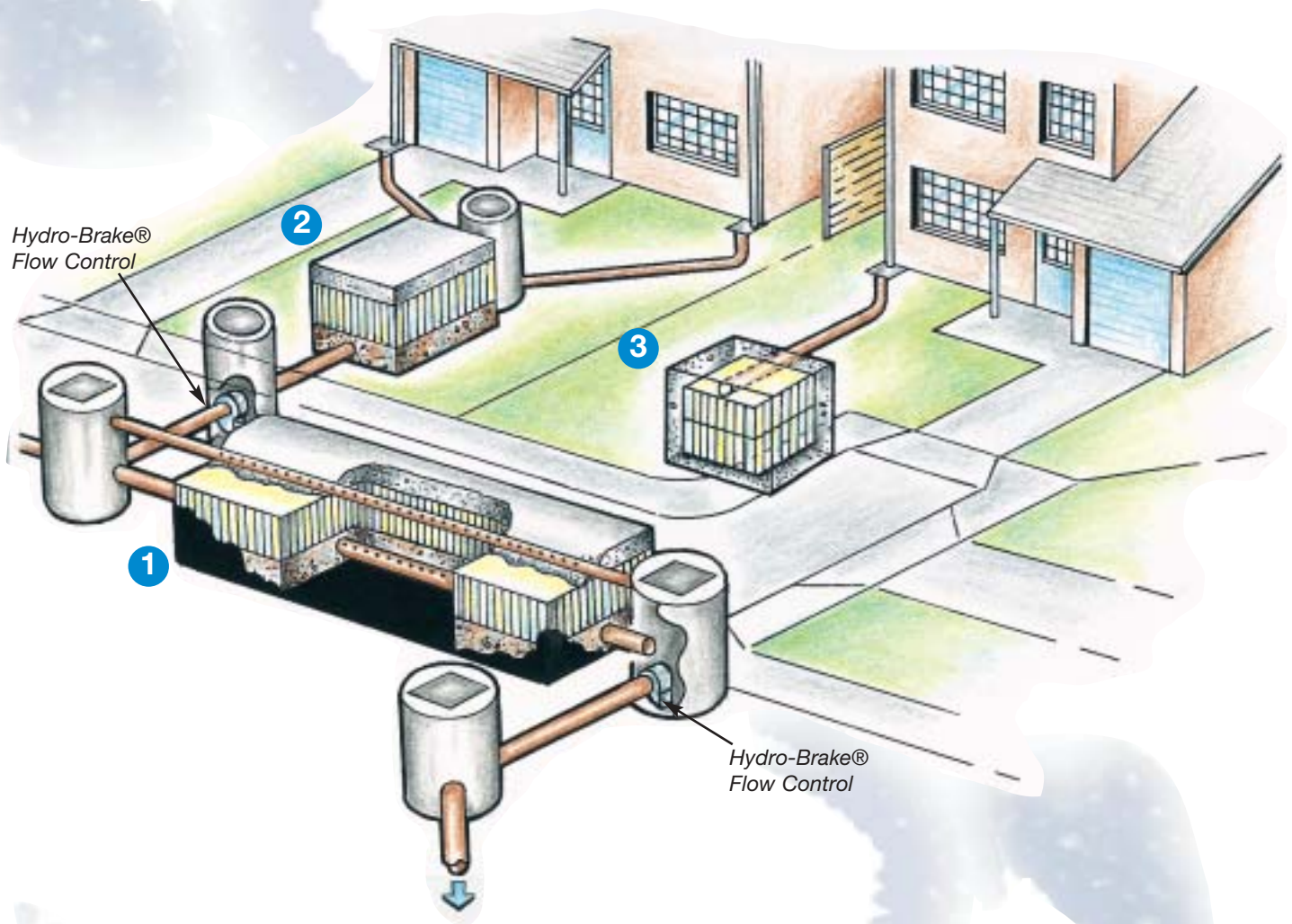


Stormcell® in an On-Line Storage/Attenuation Tank Application

1

During storm conditions flows in excess of the permitted discharge rate are limited by the Hydro-Brake® Flow Control. The excess water 'backs-up' through the perforated pipework and granular material, and is stored in the Stormcell® blocks.

An example of a large on-line storage tank.

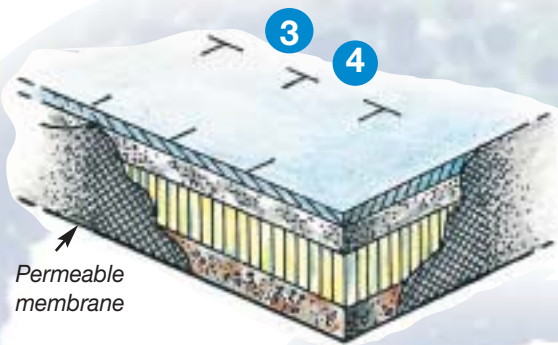


Stormcell® as a Source Control Application

2

In this configuration excess flows are again controlled by a Hydro-Brake® Flow Control and stored in the Stormcell® blocks, but rather than one large storage/attenuation tank at the lower end of the catchment, the storage can be phased as the development proceeds. Alternatively, the stored stormwater can be re-used for garden watering, car washing and so on.

An example of a phased installation on an industrial development.



Stormcell® as a Soakaway Application

3

Due to the high (95%) void ratio of Stormcell®, the overall size of the soakaway can be considerably reduced - thus giving savings in excavation costs as well as dramatically reducing the volume of granular material. Care should be taken to ensure that soakaways are designed in accordance with BRE Digest 365.

Stormcell® Under Porous Pavements

Surface water passing through a porous pavement installation can also be stored in a layer of Stormcell® prior to being drained away using pipework or, alternatively, prior to being infiltrated into the surrounding ground.

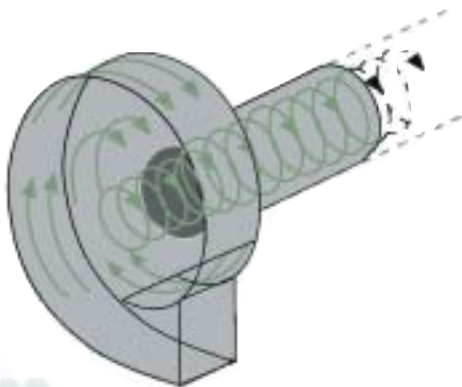


An example of porous paving in France.



Hydro-Brake® Flow Control

The Hydro-Brake® Flow Control is used to control flows from developments. Each unit is individually designed to meet the required specifications.



Advantages

- Can provide up to 50% savings in overall project costs.
- No moving parts.
- Full access for rodding/jetting.
- No power required.
- Self-activating.
- Self-cleansing.
- Minimal maintenance.
- Outlet 3-6 times larger than conventional flow controls.
- Reduces storage requirements by up to 30% compared to orifice-based controls.

Applications

- Stormwater management/source control.
- SuDS projects.
- New and existing developments.
- Sewage/water treatment plants.
- CSO structures.
- Land drainage.
- Flow balancing.

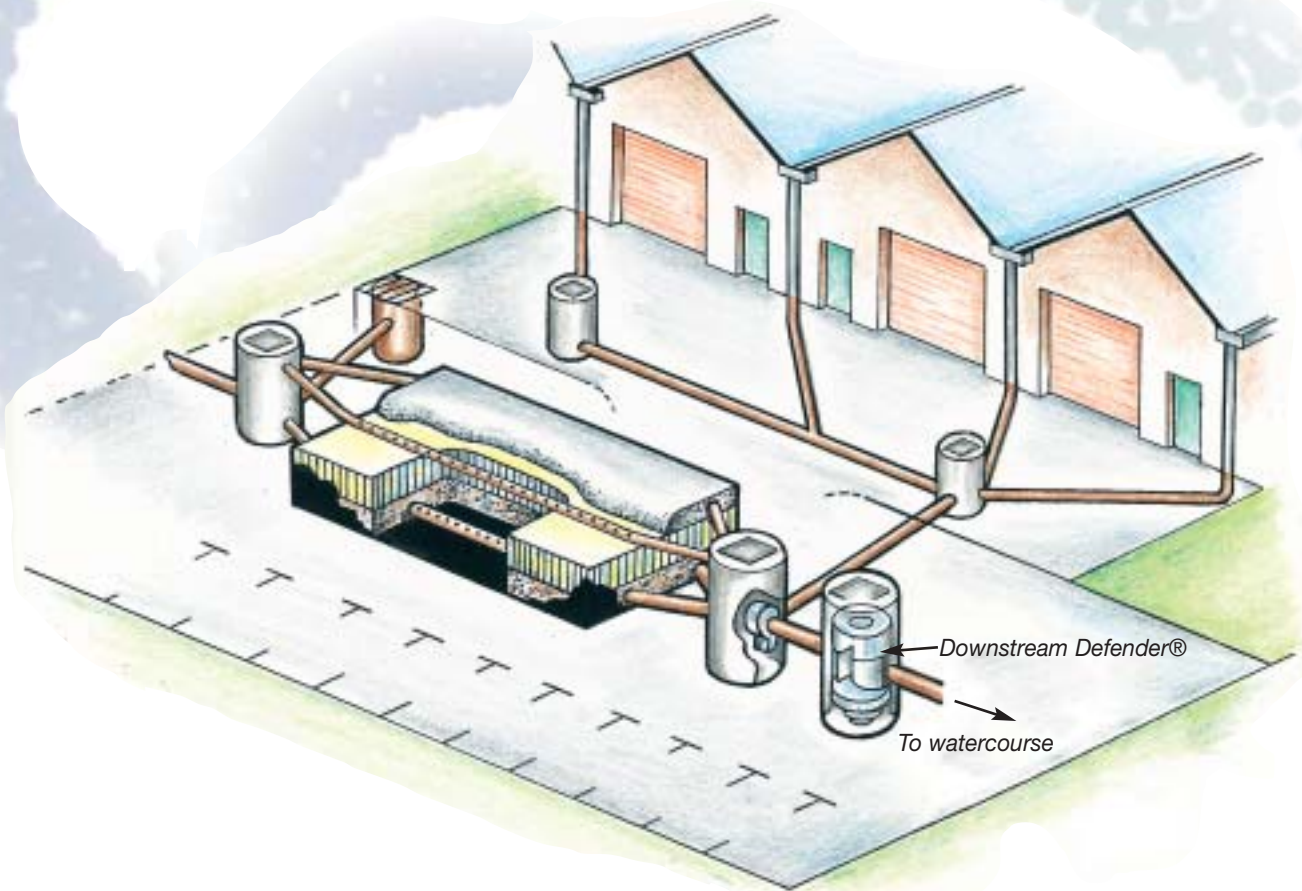


A Type SH Hydro-Brake® Flow Control.

Stormwater Treatment

When treatment of Stormwater is required, such as when it is discharged into a watercourse, silt, grit and hydrocarbons (petrol, oil, diesel, etc.) can be removed using the Downstream Defender®

The Downstream Defender® can be used with Stormcell® and Hydro-Brake® Flow Controls for a complete package system.



Downstream Defender®

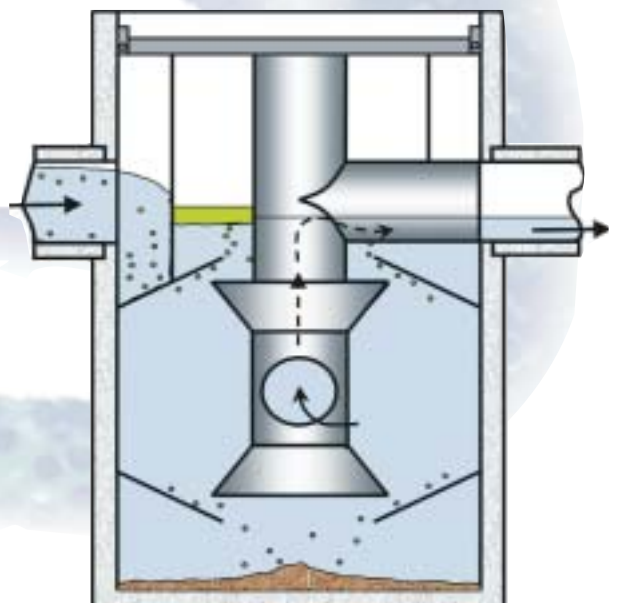
The Downstream Defender® is a hydrodynamic vortex separator which removes settleable solids (grits and silts), floatables, oil and grease from road or construction site runoff. Typical performance would provide greater than 90% removal of sediments (with a specific gravity of 2.65) down to less than 150 microns at design flows.

Applications

- Highway runoff.
- Wetland protection.
- New developments.
- Vehicle maintenance washdown yards.
- Construction site runoff.
- Car parks.
- Industrial commercial areas.

Advantages

- Available in a range of standard manhole sizes.
- No power required.
- Freestanding units for re-use of construction site runoff.
- Highly efficient with minimal headloss.
- No moving parts.
- Small footprint.
- Easy to install.
- Low maintenance.





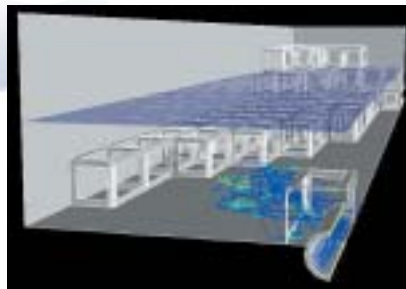
A 1.8m Downstream Defender® being fitted into a standard manhole treating flows from highway runoff.



The internal components of the Downstream Defender® manufactured in Grade 304 stainless steel being lowered into the concrete chamber.

How long will Your Storage Design last?

Prevent Silt Build-Up; Use Stormcell® with its Patented Perforated Pipework Layout



CFD simulation showing particle flow from inlet pipe within competing systems - note spreading flow path due to low velocities in the chamber, leading to deposit of sediments.

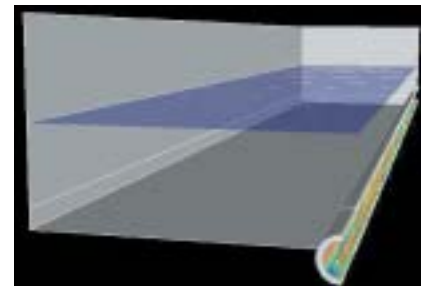


A Stormcell® system showing positioning of the patented perforated pipework layout.

A recent CFD (Computational Fluid Dynamics) study has shown that without this pipework silts, grits and debris will be deposited in the storage blocks.

**This could cause a serious reduction in storage capacity.
Recovery could be expensive or even impossible!**

The patented pipework layout underneath all Stormcell® systems ensures that any solids are washed 'through' and not 'into' the system.



A Stormcell® system showing particle flow through transverse perforated pipe. As can be seen, sediment does not enter the storage. The Stormcell® blocks have been removed for illustration purposes.

Stormcell® is NOT just another 'box/crate' storage system!

**For Further Information and Design Assistance
Call: 01275 337977**

Hydro
International



Hydro-Brake®
Flow Control



Stormcell®
Storage System



Downstream
Defender®



Grit King®
Process



HydroJet™
Screen

In September 1999 the Hydro-Jet™ Screen was awarded Millennium Product status by the Design Council.

Hydro's Hydro-Jet™ Screen (Swirl-Cleanse™ Process) won the inaugural (1997) Ken Roberts award given by CIWEM for "technical innovation in the water industry".

Winners of the 1993 Norsk Hydro (UK) Ltd award for outstanding contributions to water quality improvement and the enhancement of knowledge and awareness about water quality.

Hydro pursues a policy of continuous product development and reserves the right to change specifications without prior notice.

Hydro International with offices in UK and USA provides cost-effective solutions for controlling the quantity and improving the quality of water. For more information on the complete line of our products, please contact:

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