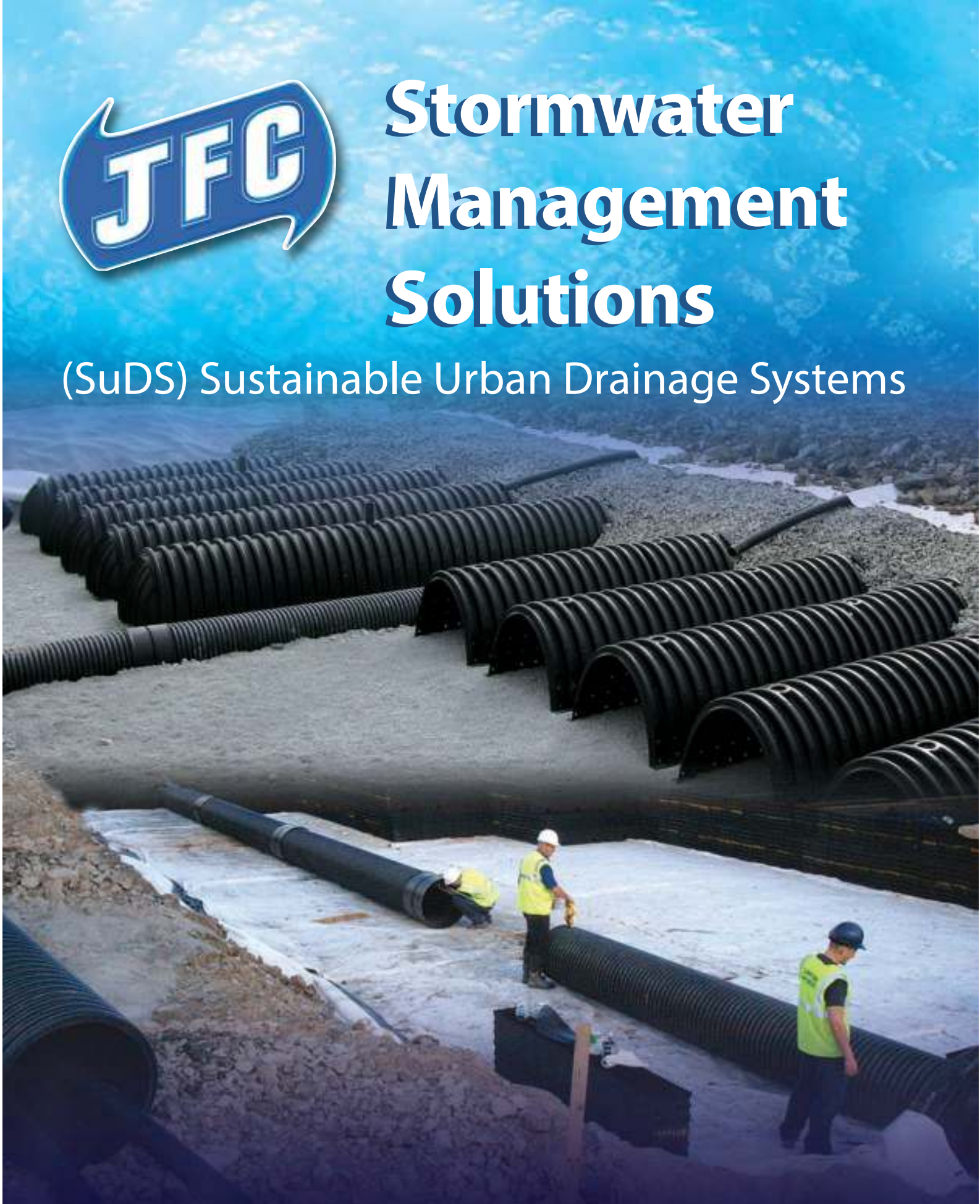
Stormwater Management Solutions

(SuDS) Sustainable Urban Drainage Systems



www.jfc.ie

V6 Nov 2010

Stormwater Management

Flooding

Rainfall on a Greenfield site is either absorbed into the ground or runs off slowly to the nearest watercourse. When these sites are built upon, much of the area becomes impermeable increasing surface water runoff which is piped to the nearest outfall or storm drain.

This increased run-off coupled with global climate changes have caused large scale flooding in many areas with conventional stormwater drainage systems being over-loaded.

Legislative Response

The EPA is now implementing European water management legislation in Ireland. Local authorities now require a sustainable urban drainage system (SuDS) to be designed for all new developments minimising down stream flooding.

SuDS are defined by the Construction Industry Research and Information Association (CIRIA) as "a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques".

Solution

JFC offers two individual systems that provide a solution to stormwater management problems.

HydroChamber System - A unique HDPE Corrugated Arch chamber with an integrated silt management system.

HydroCell System – A Polypropylene Modular Block with a 95% void ratio for maximum utilisation of space available.

Attenuation or Infiltration?

A detailed site audit is required to determine if the tank should be permeable or impermeable and if discharge to the local watercourse is suitable. This is carried out by the consultant engineer and should include analysis of the following parameters: site topography, local watercourse, winter water table level, soil type, soil infiltration rate and local authority regulations. See www.jfc.ie

Infiltration

This system disposes of all the stormwater on site through infiltration and allows the stormwater to help replenish the natural water table as would have happened before the site was developed. A key benefit is that over time a natural biomass is allowed to form on the walls and floor of the tank which filters and helps break down micro pollutants and contaminants that may be in the stormwater.

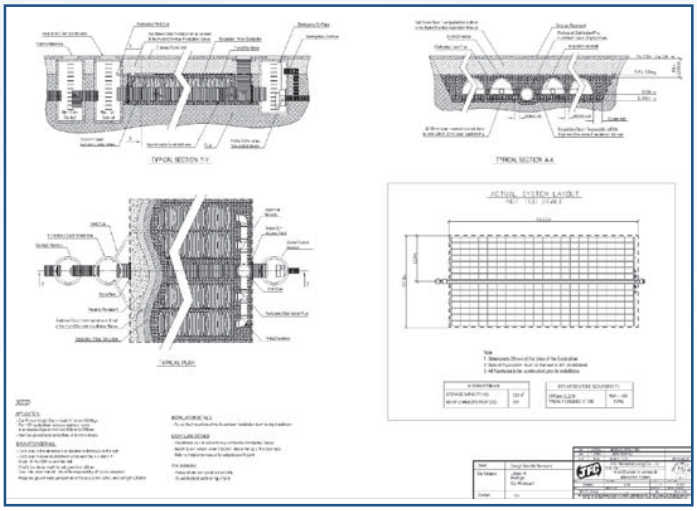
Attenuation

Where possible it is recommended to dispose of the storm water through the use of a permeable attenuation system. This controls the rate water enters watercourse or storm drain while allowing infiltration to the ground. On some sites (e.g. high water table) the attenuation system is impermeable sending all water directly to the watercourse or storm drain.

Design – Supply – Install

Design Services

- Customised stormwater management solutions in accordance with local authority legislation.
- Tank sizing and calculations
- Detailed report (for planning permission)
- On Site Consultation



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Stormwater Management Report

Reference: HCR-0676

Date: 28th July 2008

Site Address: Rochfordsbridge, Co. Westmeath

Client: MMR Associates

Client Address: Main Street, Belis, Co. Mayo

Contact: David Kelly

Introduction:

This report outlines the stormwater storage calculations for a development at Rochfordsbridge, Co. Westmeath. The storage volume of the attenuation tank was calculated using the modified rational method as outlined the Wallingford procedure "Design and analysis of urban storm drainage". The greenfield runoff was calculated using the Institute of Hydrology Report No. 124 as outlined in the same publication.

Attenuation / Infiltration

JFC have adopted best management practices in stormwater management as outlined in both the SuDS manual from CIRIA and the Technical Guidance document on SuDS published by British Water in conjunction with the Environment Agency along with many other European and international industry standards. For this reason JFC recommend that an individual site assessment be carried out on all sites by the consultant engineer or by suitably qualified and competent personnel. Following industry standards this assessment should first consider allowing infiltration to the ground as outlined in the Technical Guidance document on SuDS published by British Water in conjunction with the Environment Agency.

On some sites infiltration or permeable attenuation is not possible e.g. high water table, located on a flood plain, site topology etc. and in these cases an impermeable (fully sealed) attenuation tank is recommended. A site audit by the consultant engineer will determine the required system.

1

Supply and Installation Services

JFC offer a number of options when supplying and installing a stormwater management system.

- Supply and install
- Supply and supervise
- Supply only

All JFC stormwater management solutions include full excavation drawings.

- Full Design Service
- Stormwater Management Reports
- Excavation drawings
- AutoCAD Drawings
- Excel Calculators
- Design Manuals
- Installation Manuals
- WRc / BBA Certification
- Technical Presentations
- Local Authority Support

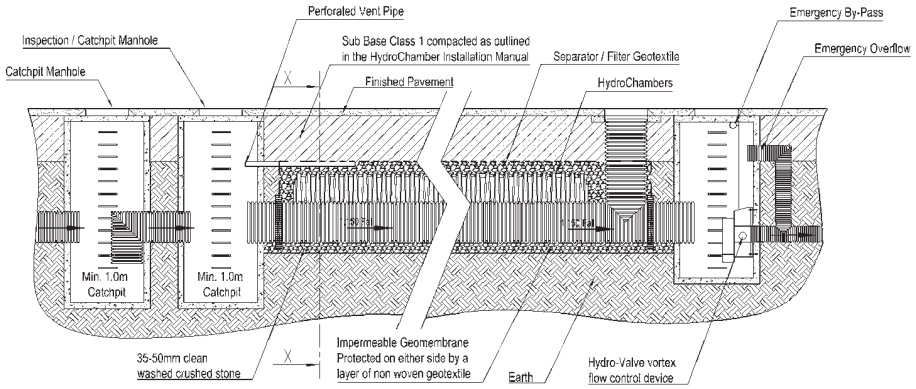
HydroChamber Systems

HydroChamber

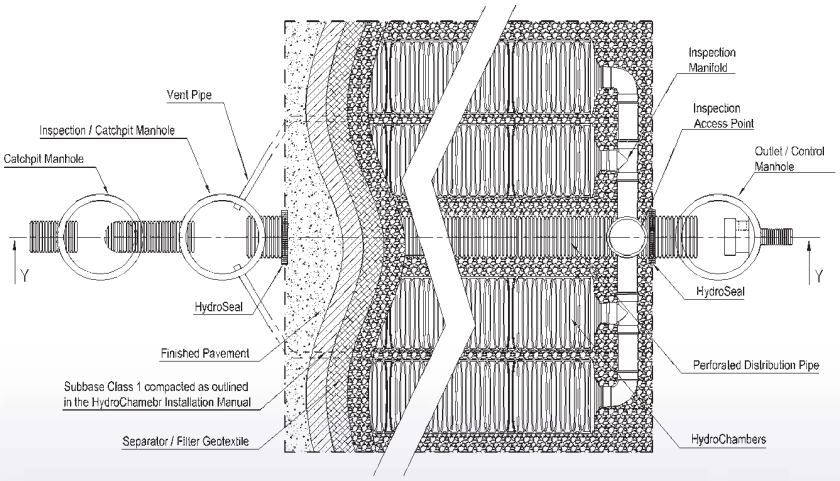
The HydroChamber stormwater management system is used in stormwater attenuation and soak away applications to provide an underground storage tank for stormwater runoff. It can be used under HGV trafficked areas and car park trafficked areas as well as non trafficked areas (e.g. green amenity areas). The chambers are manufactured from high density polyethylene and are backfilled with 35/50mm clean washed crushed stone. The corrugated arch shape of the HydroChamber provides excellent structural strength as shown in independently witnessed field tests where the chambers were exposed to loads four times that expected in service. HydroChambers can be used in three different types of stormwater management systems 1) Infiltration / Soak-away System, 2) Permeable Attenuation Systems, 3) Impermeable Attenuation Systems. A site audit will determine the most suitable system. See www.jfc.ie for more details.

Inspection & Maintenance

The HydroChamber has a unique system that minimises any grit / silt entering the system with the use of two upstream catchpit manholes. Maintenance and inspection can be carried out on the main distribution pipe with standard drain cleaning and inspection equipment. The chamber rows can be camera inspected from the inspection manifold as required.

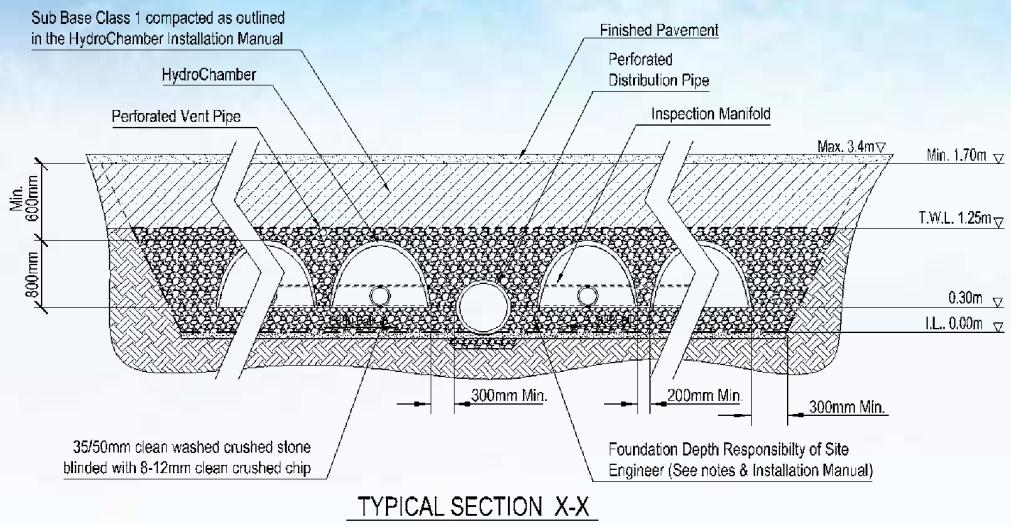


TYPICAL SECTION Y-Y



TYPICAL PLAN

HydroChamber Systems

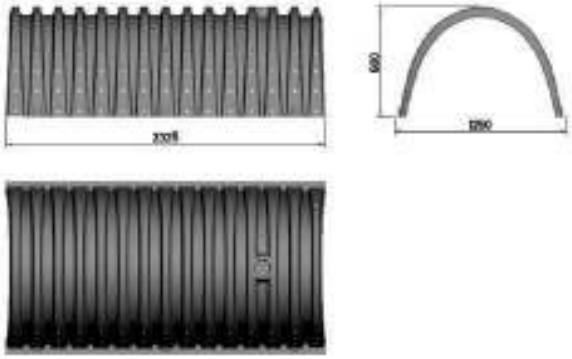


TYPICAL SECTION X-X

Features and Benefits

- WRc Approved
- BBA Certification
- Superior Structural Integrity.
- Visual and Camera Inspection
- Flushing / Jetting Maintenance
- Silt / Grit Management System
- Stackable for Storage on Site
- Design and Installation Manuals
- Sizing Calculator
- AutoCAD Drawings
- Full Technical Assistance
- Installation Service

Certificate No: PT/273/0608



HydroChamber 800 Specification

- Overall Dimensions (mm): 2325 x 1265 x 800
- Installed Dimensions (mm): 2175 x 1265 x 800
- Nominal Chamber Storage (m^3) 1.40
- System Storage* (m^3): 2.1—2.8 m^3 / Chamber
- Lateral Flow: 114 Holes of Ø20mm.

*System storage is dependent on foundation depth, distribution pipe diameter and overall system size. See HydroChamber calculator for more details. www.jfc.ie

HydroCell Systems

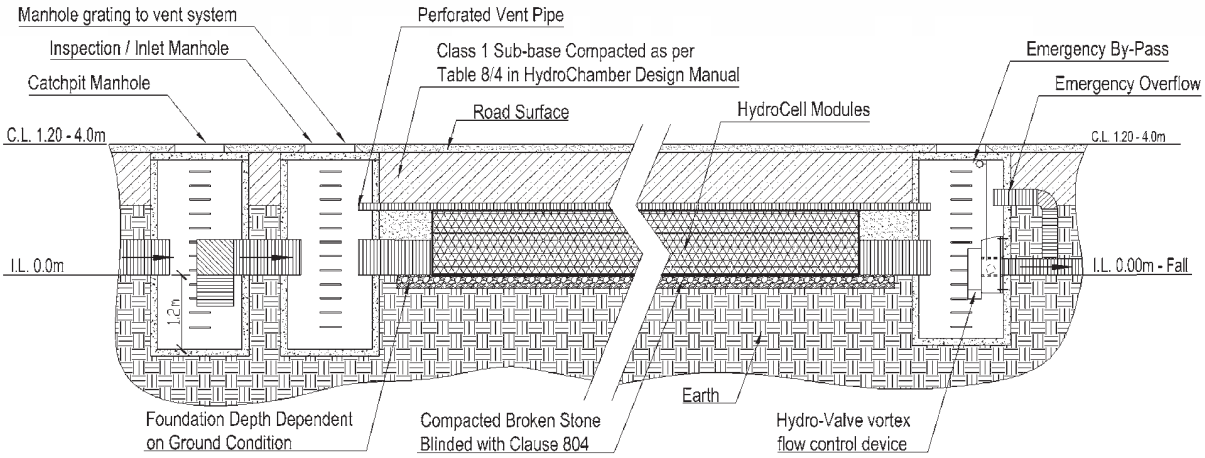
HydroCell

The HydroCell system is a polypropylene modular block with a 95% void ratio. The blocks are assembled together to form an underground storage tank for stormwater run off. It can be used under both HGV traffic and car park traffic areas as well as non trafficked amenity areas.

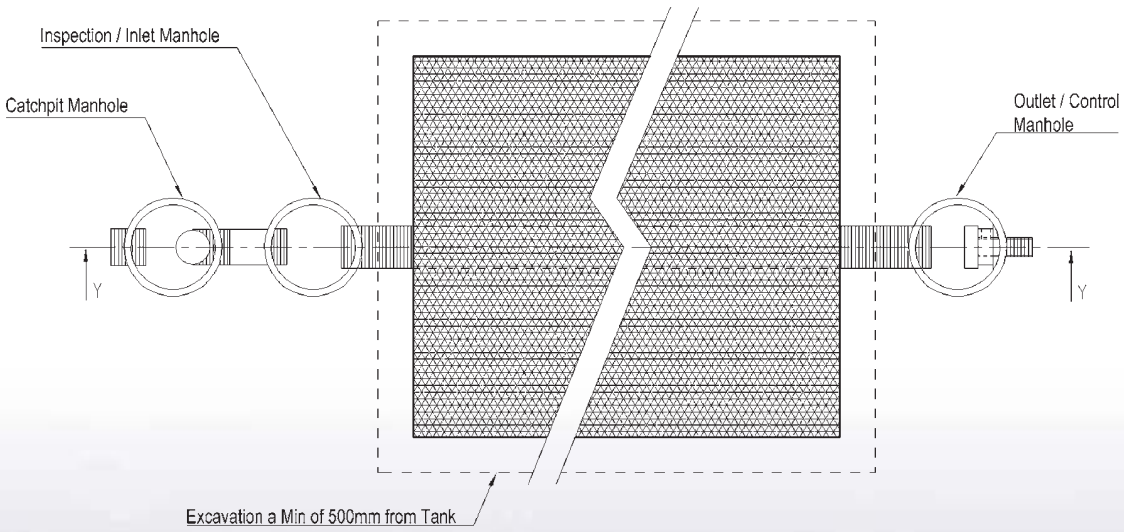
HydroCell blocks can be used in three different types of stormwater management systems 1) Infiltration System, 2) Permeable Attenuation System, 3) Impermeable Attenuation Systems. The tank lining is dependent on the type of system being used. A site audit will determine the most suitable system. See www.jfc.ie for more details.

Inspection & Maintenance

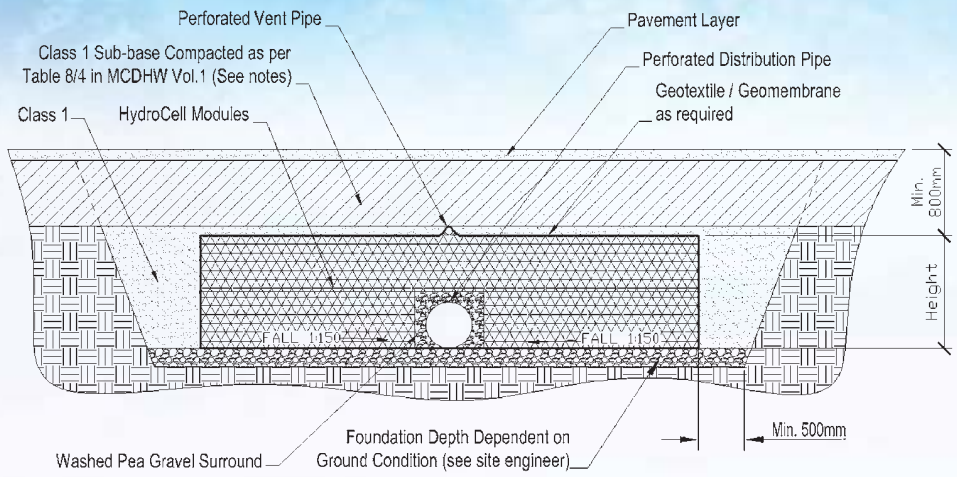
Stormwater firstly enters the catch pit manhole where all heavy silt / grit and floatables are trapped, it then enters the inspection manhole which is connected to the HydroCell blocks with a suitable diameter pipe for inspection and maintenance. The distribution pipe is solid outside the tank and perforated inside the tank for lateral flow. The stormwater leaves the system through infiltration and / or the Hydro-Valve vortex flow control device depending on the type of system being installed.



SECTION Y-Y



HydroCell Systems



Features & Benefits

- **Lightweight Rigid Design**
- **Modular Construction**
- **Fast Installation**
- **Various Strengths Available**
- **Silt Management**
- **Cost Effective**
- **Technical Assistance**
- **On-Site Consultation**

Standard Block		**Half Block**
Length	2400mm	2400mm
Width	325mm	325mm
Height	610mm	305mm
Gross Volume	0.475m^3	0.237m^3
Void Ratio	95%	95%
Material PP	PP	PP
Perforated SA	60%	60%
Strength	up to 400kn/m^2	up to 400kn/m^2

Hydro-Valve
Vortex Flow Control

- WRc Certification
- Customised Specification
- No Moving Parts
- Self Activating
- Self Cleansing
- Manual By-Pass
- Easy Installation
- 3-6 Times Greater Orifice CSA
- Hydraulic Data Available

Storm Water Flow Control

The Hydro-Valve is a vortex flow control device for controlling stormwater flow to a specific rate before discharge into a local storm drain or water course. Sizes are available between 1-50 l/s, contact JFC for larger flows.

Design

JFC Hydro-Valves are manufactured to customer specifications. They are custom designed to achieve a specified design flow rate at a given head height. The units are designed to fit into one of the following manhole types depending on specification

Curved Back	Flat Back**
Ø1200mm	Ø1050mm
Ø1350mm	Ø1800mm
Ø1500mm	Ø2100mm
Ø1800mm*	Ø2400mm

* Only available on larger units

** Requires a concrete shuttered wall on the inside on the manhole chamber.

Quality Assurance

JFC Hydro-Valves are manufactured to ISO 9001:2000 quality assurance system.

Installation

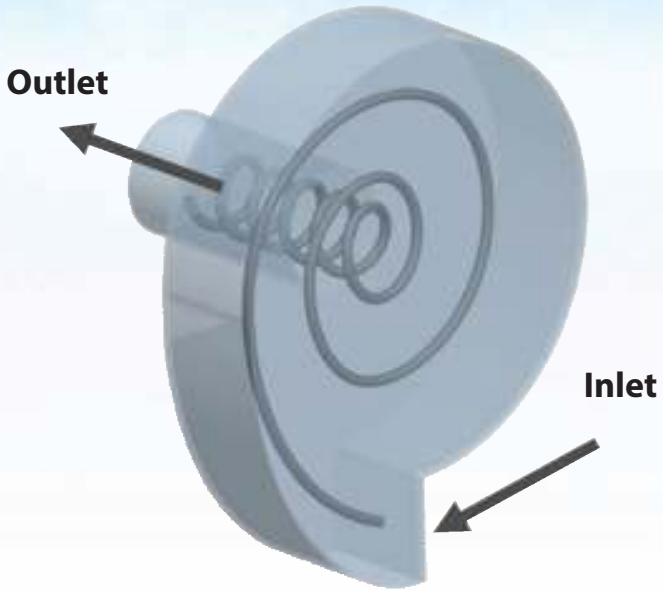
JFC Hydro-Valves unique patented design allows for quick and easy installation onto various types of manholes (see above). The unit is fixed to the inside wall of the manhole with a number of steel stud anchors. A manual by-pass is also incorporated in the valve for remote operation in the unlikely event of a blockage.

Hydro-Valve
Vortex Flow Control

Operation

The HYDRO-VALVE is a device for controlling stormwater flow by hydraulic effect without requiring moving parts. At low flow rates, water entering through the inlet passes through the vortex chamber to the outlet with no restriction. As flow rate increases water enters through the inlet with enough energy to create a vortex in the vortex chamber which results in a considerable pressure drop between the inlet and the outlet restricting the flow to the allowable discharge.

The Hydro-Valve therefore operates automatically with no moving parts and no external power source. A typical application of this valve is to control the flow from storm water attenuation tanks preventing downstream flooding during periods of heavy rainfall.



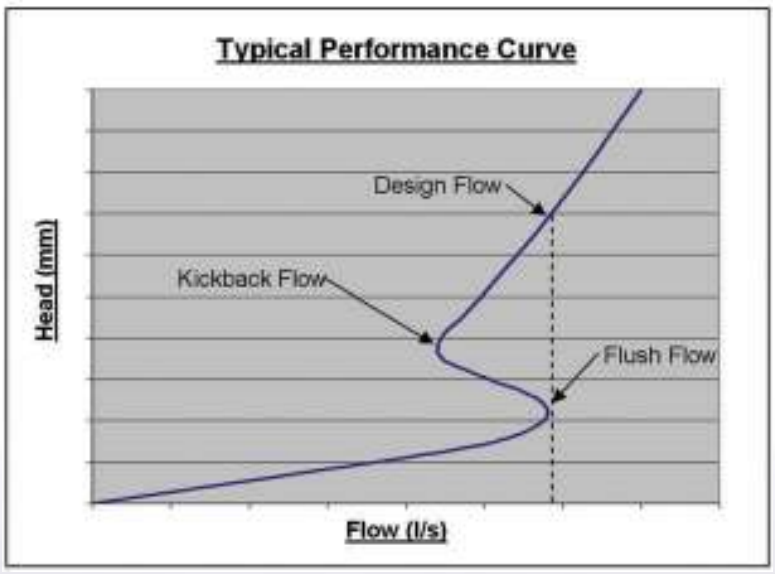
Performance

Design Flow - The maximum flow that is required .i.e. maximum allowable discharge.

This point is different for each individual Hydro-Valve depending on specific specifications which is usually stipulated by the local authority.

Flush Flow - The point at which the vortex begins to initiate and has a throttling effect which starts to restrict the flow, sending the performance graph in the opposite direction.

Kick-Back Flow - This is the point at which the vortex has fully initiated and at which point the curve begins to return back to follow that of a more conventional flow control



CorriPipe™ & Fittings

CorriPipe™

CorriPipe™ is a Twin Wall high density polyethylene pipe manufactured from 100% recycled plastic.

The pipe is manufactured in an extrusion process, which forms two pipes, and heat welds them together as they are formed. The outside wall is corrugated whilst the inside wall is smooth.

Applications

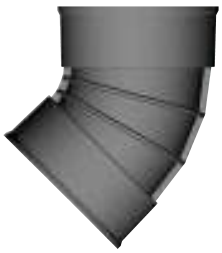
CorriPipe™ is suitable for use in Civil Engineering, Agriculture and other sub-soil applications. This pipe is available perforated, unperforated and half perforated, which broadens the range of applications for which it is used.

Nominal I/D	94mm	150mm	225mm	300mm	375mm	450mm	600mm
NominalO/D	110mm	180mm	268mm	355mm	426mm	510mm	675mm

Features and Benefits

- Lightweight (6 metre Lengths)
- Strong (Twin walled and corrugated)
- Smooth inner wall for increased flow capacity
- Resistant to naturally occurring chemicals
- Can be installed at depths from 0.5 to 10 metres.
- Full range of fittings available
- BBA, HAPAS Roads & Bridges Agrement Certificate No 02/H069
- Reduced Plant and labour costs
- Faster Installation as 6 Meter lengths mean fewer joints
- Elimination of waste compared to traditional pipe.
- Pipe can easily be cut on site

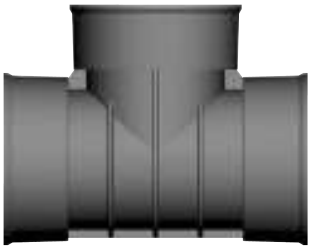
Fittings & Accessories



CorriPipe™ Bends

Range of bends including 30º, 45º and 90º from 150mm to 300mm available from stock.

Fittings:		
150TB15	225TB15	300TB15
150TB30	225TB30	300TB30
150TB45	225TB45	300TB45
150TB90	225TB90	300TB90



CorriPipe™ Equal Tees

Range of sizes of equal Tee's from150mm to 300mm available from stock.

Fittings
150TT90
225TT90
300TT90

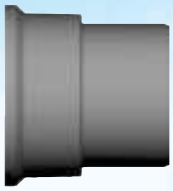
CorriPipe™ Unequal Tees

Range of sizes of unequal Tee's from 150mm to 300mm available from stock

Fittings:
225/150TT90
300/150TT90
300/225TT90
375/150TT90

CorriPipe™ Fittings & Accessories

CorriPipe™ Adaptors:



To connect twin wall to single wall sewer are available from 150mm to 300mm for 6", 9" & 12"pipes.

Fittings:

TC150/SWS6" TC225/SWS9" TC300/SWS12"

CorriPipe™ Equal & Unequal Wyes

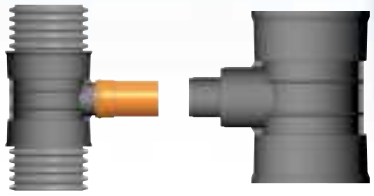
Range of sizes from 150mm to 300mm available from stock

Fittings:

150TY45 225TY45 300TY45

225/150TY45 300/225TY45 300/150TY45 375/150TY45

CorriPipe™ Sewer Tee's



To T-off Twin Wall Pipe to 4inch/6inch single wall sewer. Range of fittings include:

Fittings:

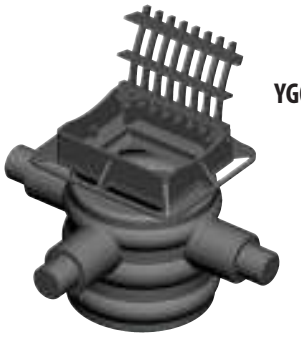
150/SWS6"TT90 225/SWS6"TT90 300/SWS6"TT90 375/SWS6"TT90

CorriPipe™ Fabricated Fittings

All of the above fittings are available to order in larger sizes i.e. 375mm, 450mm, and 600mm.

Gullies

JFC polyethylene gullies offer a direct alternative to precast gullies.



YG01 - 940 long x 698 wide x 450 Deep

RG05 and YG01 are designed to accept a 390 x 315mm clear opening heavy duty road grate as demonstrated above. (Not Supplied)

The RG01 and RG03 will also accept this heavy duty road grate when blockwork has been carried out.

RG01 - Ø375 X 760 Deep

RG03—Ø450 x 750 Deep

RG05 is a specially developed road gully designed to meet the requirement for a shallow gully and pavement repair work. RG05 will accept 150mm twin-wall pipe.

RG05—390 long x 315 wide x 390 Deep

JFC Pioneer Water Tanks

- Cost Effective Water Storage
- Sizes range from 12,000 to 2.6 million litres
- Fast Installation time frame & manoeuvrability
- Easy Transportation
- Heavy duty 5-Layer Aqualiner approved to Drinking Water Standards
- 10 Year Warranty

Fire Tenders Tank

- Large Volume Water Storage
- Suitable for all Commercial Developments

Agricultural Purposes

- Rainwater Harvesting
- Drinking water for animals, Wash down, Spraying, Horticulture etc
- Intermediate Bulk Water Storage

Municipal & Commercial Applications

- Storage from 20,000 Ltrs up to 2.6 million Ltrs (from 4,400 gals to 570,000 gals)
- Approved Drinking Water Storage

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