

Detention

Standard DN500 HydroCon pipes are able to store 196 litres of water per linear metre of pipe. Water is exfiltrated through the walls of the pipe at estimated rates shown in Table 1.

HydroCon pipes have the potential to be used in many urban situations where water is required to be temporarily detained to reduce pressures on existing stormwater systems.

HydroCon Pipe Design Guidelines

Guidelines have been prepared to assist designers incorporate HydroCon pipes using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) software. Modelling in MUSIC allows assessment of the relative performance of HydroCon pipe systems over other stormwater treatment options.

The Guidelines, which can be viewed or downloaded from the HydroCon website, can be used to:

1. configure a water quality treatment system incorporating HydroCon pipes;
2. calculate the number of pipes required.

Installation

HydroCon pipes are easily and quickly installed. Pipes are generally laid as single or double pipelines but can be configured in other arrangements appropriate to site constraints. The pipes are placed at zero gradient in a trench or basin, which is then backfilled with appropriate filter media. The system may be 'confined' using an impermeable liner and underdrains to deliver treated water to waterways or storage.

Maintenance

A GPT should always be installed upstream of a HydroCon pipe system to prevent coarse sediment and debris impeding the flow of water through the HydroCon pipe wall. While sediment will not harm the pipes, buildup on the walls of the pipes will affect exfiltration performance over time. Pre-treating flows lessens the need for cleaning and reduces maintenance costs.

HydroCon pipes can be cleaned as the need arises (eg very low exfiltration rates) with standard industrial high pressure hosing and eduction equipment.

Awards

HydroCon pipes have featured in numerous industry awards over the past 10 years, a selection of which appear below:

Highly Commended: 2010 IPWEA (Institute of Public Works Engineering Australia – NSW) Engineering Excellence Awards (Environmental Enhancement Project or Initiative Category)
Powells Creek Reserve Stormwater Harvesting System, Concord West. City of Canada Bay Council

Winner: 2008 Stormwater Industry Association Award for Excellence in Stormwater Management - Ashgrove Residential Estate, Regents Park. Mirvac in partnership with Storm Consulting

Winner: 2008 Stormwater Industry Association Award for Excellence in a Stormwater Quality Device or Measure - Exfiltration Stormwater Treatment Systems. Storm Consulting in partnership with HydroCon, Hornsby Shire Council, Kiama Council, CABP and UTS

Winner: 2007 Stormwater Industry Association Awards for Surface and Groundwater Management - Kinross Business Park sustainable industrial development. CABP in partnership with Storm Consulting

HydroCon®



Permeable
Concrete
Pipes



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Managing water in the urban environment

HydroCon Permeable Concrete Pipes

HydroCon pipes are manufactured in Australia from crushed rock to a carefully formulated concrete mix designed to achieve a level of permeability based on 10% voids. Stormwater sediments and pollutants settle on the sealed base of the pipe or are captured as water exfiltrates through the walls of the pipe.

Standard pipes have an internal diameter of 500 mm and a length of 1 m. Dry weight of a standard pipe is 240 kg. Heavy duty pipes and pipes with other diameters (DN100 – DN1000) can be supplied for special requirements.

Exfiltration rates from HydroCon pipes have been tested under laboratory conditions (Table 1). It is recommended that 50% of the unimpeded reported rate be adopted to allow for accumulation of sediment on the walls of the pipes.

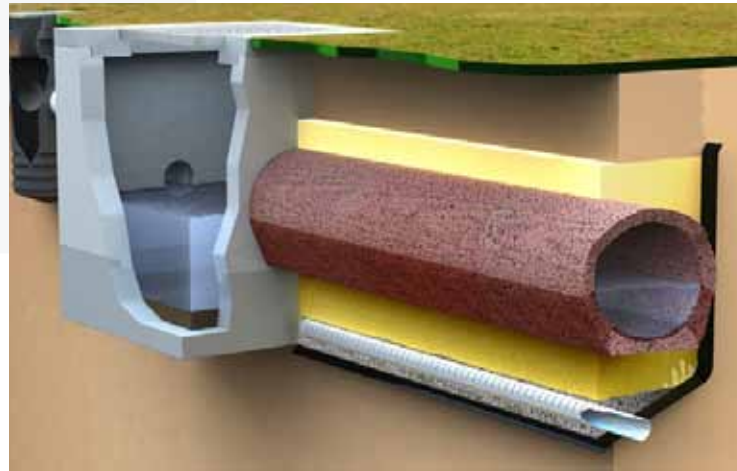
Pressure head above the pipe obvert	Minimum unimpeded exfiltration rate	Impeded minimum exfiltration rate [50% of unimpeded]
m	l/s/m of pipe	l/s/m of pipe
0.15	1.2	0.60
0.65	1.9	0.95
1.15	2.4	1.20
1.65	3.0	1.50
2.15	3.3	1.65

Table 1

Applications

HydroCon pipes are used for:

- Water quality improvement
- Bioretention
- Detention
- Drainage, street ponding, infiltration, aquifer recharge
- Stormwater harvesting



Bioretention

HydroCon pipes are increasingly being specified to improve the performance of bioretention systems. By delivering pre-treated stormwater to the subsurface of a bioretention or stormwater filter system, common concerns over surface crusting and clogging of filtration media can be avoided, thus considerably extending service life.

Incorporation of HydroCon pipes in bioretention systems also allows systems to be designed for larger catchments, and to overcome limitations to recreational and other activity due to restrictive vegetative cover.

Water quality

HydroCon pipes improve water quality by removing sediment, phosphorus and heavy metals. Extensive research conducted by the Faculty of Engineering at the University of Technology Sydney (UTS), with support of an Australian Research Council (ARC) Linkage Grant, and in field and laboratory studies in Germany, show that combined HydroCon pipe and media filtration systems remove between 90% and 98% of phosphorus and heavy metals, including zinc and copper. Removal of nitrogen occurs in the filter media surrounding the pipes.

The very low velocity pipeline environment allows sediments to fall out of solution and accumulate on the base and walls of the pipes. Phosphorus and heavy metal particles bind strongly with sediments, while soluble phosphorus is adsorbed by the pipe matrix as water flows through the walls of the pipes.

