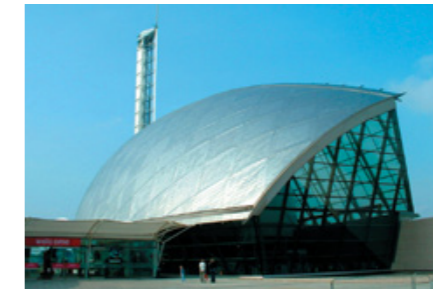


Terrain Hydromax

Siphonic rainwater drainage system

Terrain HydroMax™ Siphonic Drainage



With ten times the flow capacity of a conventional gravity system and significantly faster water removal rates, Terrain HydroMax™ 'sucks' water from a roof to cope with downpours that would overwhelm a gravity system and is ideal for complex roof shapes.

Offering valuable total project cost savings of typically 20-45% over a conventional system, Terrain HydroMax™ can be factory prefabricated and gives important structural and space savings, with a reduced build programme.

Terrain HydroMax™ has a comprehensive range of roof drains for every flat and pitched roof membrane, from asphalt to bitumen to modern single ply membranes.

Ideal for commercial, industrial, sports, leisure, education and healthcare buildings, the roof drains are extremely compact and the range includes an inlet for the top deck of multi-storey car parks.

10 times the flow capacity of a conventional gravity system

Faster water removal rates

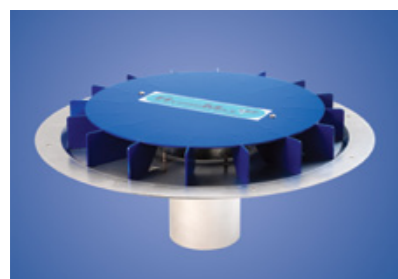
20-45% cost savings over a conventional gravity system

Reduces and simplifies underground drainage

Ideal for complex roof shapes

Structural and space saving

Accurate design software



Designed to rapidly remove the high volumes of water deposited in extreme rainfall events from the roof areas of today's increasingly larger buildings, the Terrain HydroMax™ siphonic drainage system offers a complete and proven solution.

Outstandingly accurate design software

Terrain HydroTechnic™ design software enables the designer working to BS 8490:2007 to achieve exceptionally accurate calculations which underpin the success of any engineered hydraulic siphonic drainage system. Independently tested by the world's leading

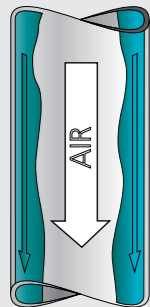
Hydraulic Research Centre in the UK, compliance with the performance requirements of BSEN 12056-3:2000, Terrain HydroTechnic™ produces calculations, factory ready drawings and bills of quantities.



How it works

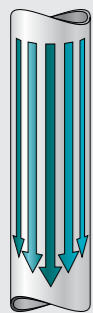
The Terrain HydroMax™ system ‘sucks’ water from the roof, using a powerful hydraulic force created by water accelerating down the full height of the building to deliver far greater capacity and flow rates than a gravity system. In a gravity drainage system, pipework carries both air and water. The flow in gravity pipes is extremely inefficient because of the large core of air which enables the water to flow resulting in the need for larger pipes and more of them as well as extensive underground systems.

In the Terrain HydroMax™ system as rain falls, the roof drain prevents the ingress of air, rapidly purging it until the system is fully primed and running full bore. Water is transported in smaller diameter pipes to fewer, more convenient locations. The system responds quickly to rainfall changes, is self-cleaning, drains rapidly when rainfall ceases, and is designed to prevent blockage by leaves, twigs and other debris.



Gravity flow

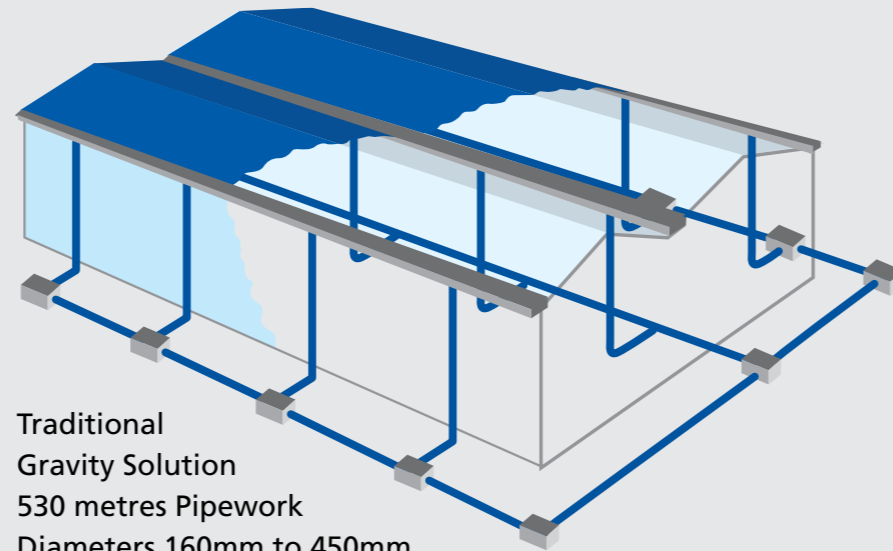
A gravity drainage system limits capacity to one-third water that adheres to the inner pipe wall with a large two-thirds air core.



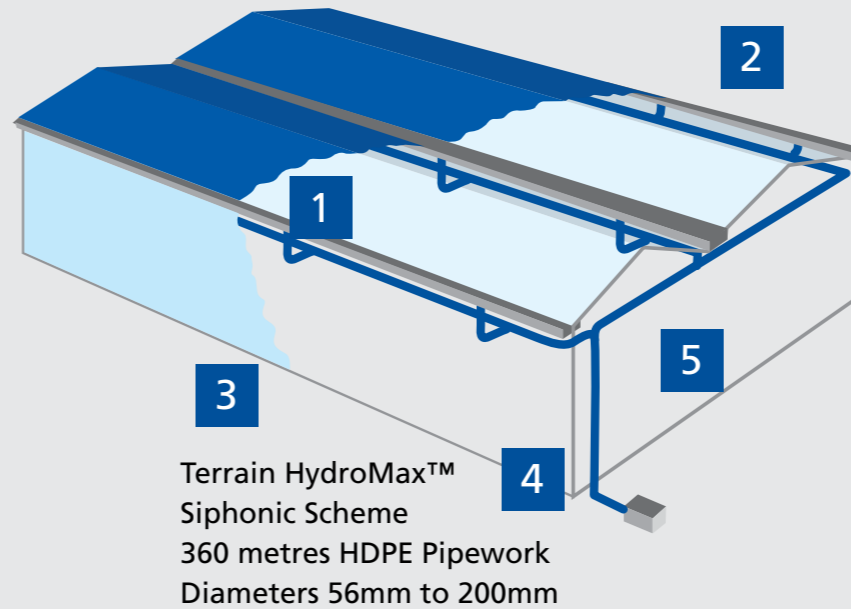
Terrain HydroMax™

In the Terrain HydroMax™ system air is purged from the pipe so that it runs 100% full of water, normally achieving 10 to 15 times higher flow rates.

Saving time and money



Traditional Gravity Solution
530 metres Pipework
Diameters 160mm to 450mm



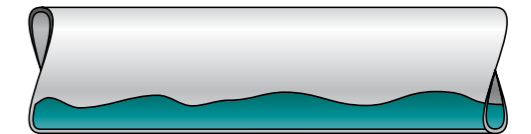
- 1 Small diameter collector pipes installed level without slope
- 2 High performance Terrain HydroMax™ roof drain
- 3 Significant reduction in underground drainage, trenching, soil removal, treatment or backfill
- 4 Design team or clients' chosen downpipe locations
- 5 No drainage under building floor slab

Terrain HydroMax™ Siphonic Scheme
360 metres HDPE Pipework
Diameters 56mm to 200mm

The 4 steps of water flow through a siphonic system

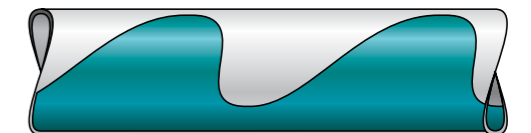
1. Gravity flow

Air carried above water



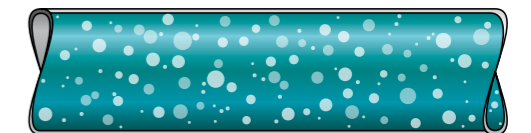
2. Plug flow

Air pockets driven down pipe with water ‘plugs’ to ensure self-cleaning



3. Bubble flow

Water fills pipe and carries bubbles in suspension



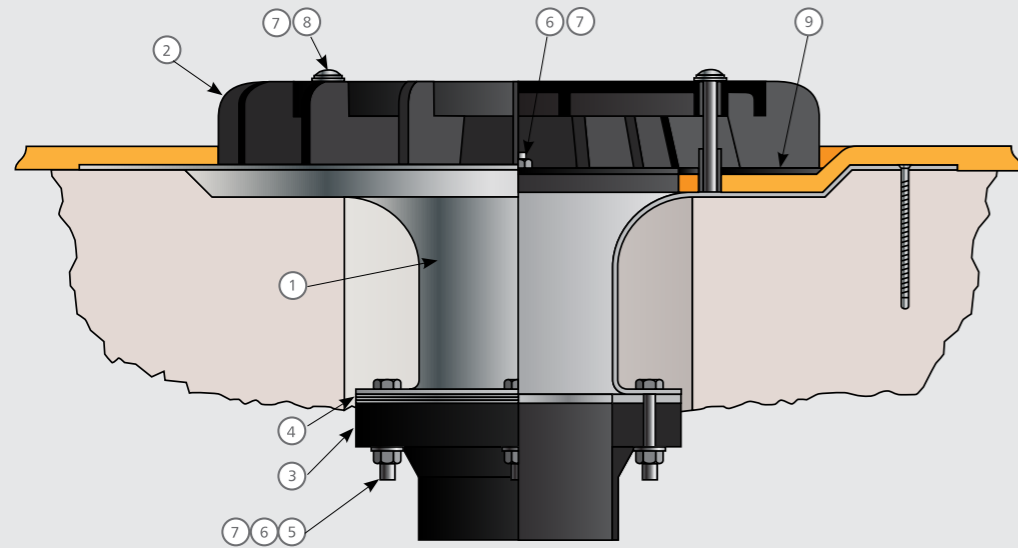
4. Full bore flow

Water fills pipe with all air purged and excluded, delivering far greater capacity and flow rates

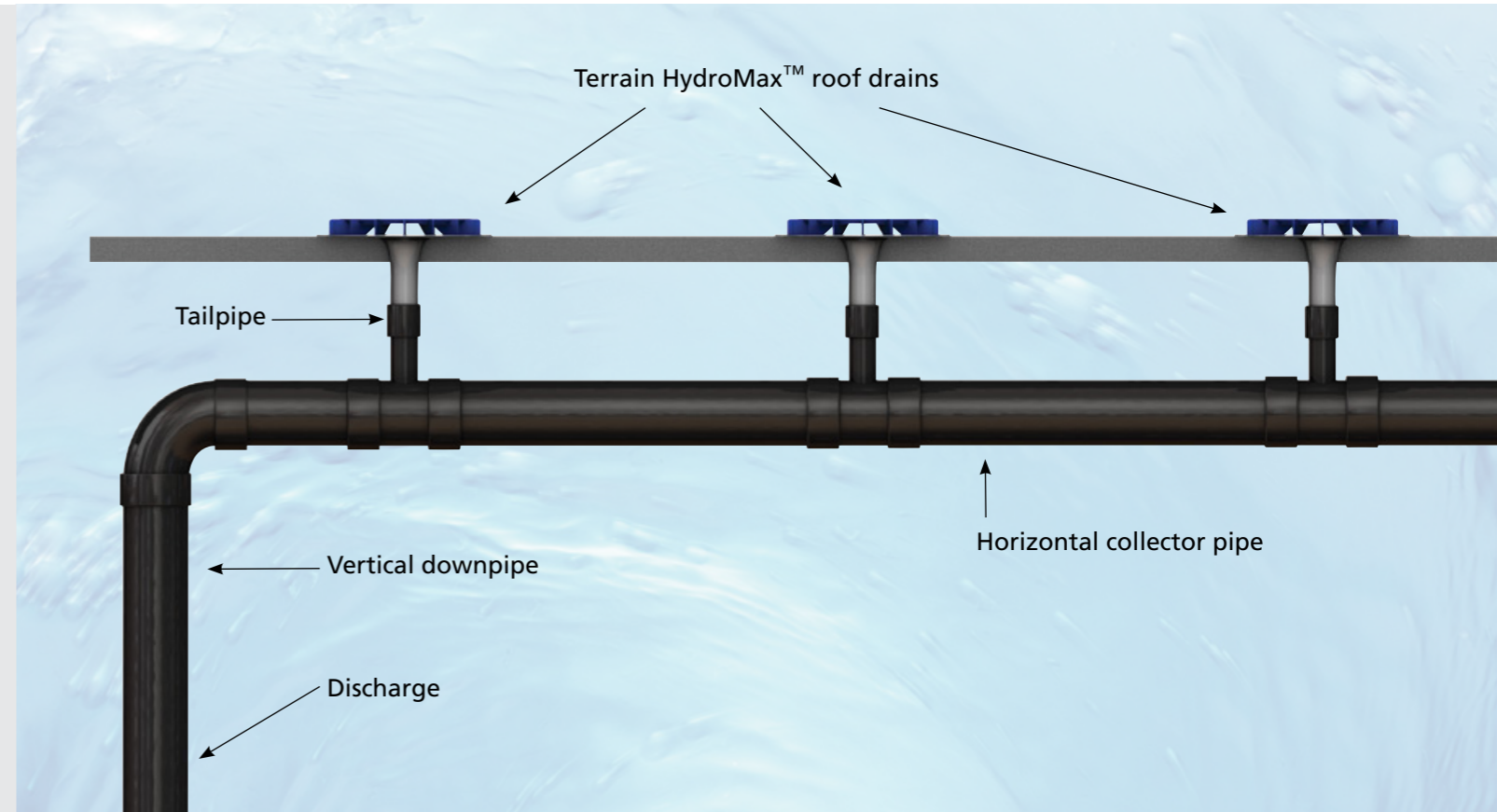


The roof drain and piping system

The Terrain HydroMax™ roof drain incorporates a one-piece inducer or air baffle plate, which becomes submerged in shallow water to exclude air. The height of the inducer above the body ensures the system primes rapidly with a minimum depth of water.



- KEY**
1. Terrain HydroMax™ roof drain body
 2. Terrain HydroMax™ inducer
 3. HDPE stub flange connector
 4. Neoprene gasket
 5. Hex headed set screw
 6. Full nut
 7. Washer
 8. Button headed cap screw
 9. Flashing ring



The inducer fins extend beyond the cover plate to restrict the formation of vortices by swirling water, which could entrain air. The fins also prevent blockage by debris and although the entire system is low maintenance, good housekeeping practice is recommended.



The roof drain is of a compact design and the system has over thirty different models available to cope with a range of roof types. The tailpipe below the roof drain is of relatively small diameter and in use, a series of tailpipes is connected to a horizontal collector or leader pipe below the roof.

Flow capacity

A 75mm roof drain can remove up to 25 litres of rainwater per second, whilst the 125mm drain can remove up to 100 litres of rainwater per second with certain piping configurations.

The piping system

The collector pipe is normally installed horizontally without slope at high level and runs to a convenient point where it drops to ground level with a transition break connection into the below-ground gravity drainage system or manhole chamber.



Terrain Fuze high density polyethylene pipes are manufactured in the UK to BS EN 1519-1:2000

Terrain Pipework

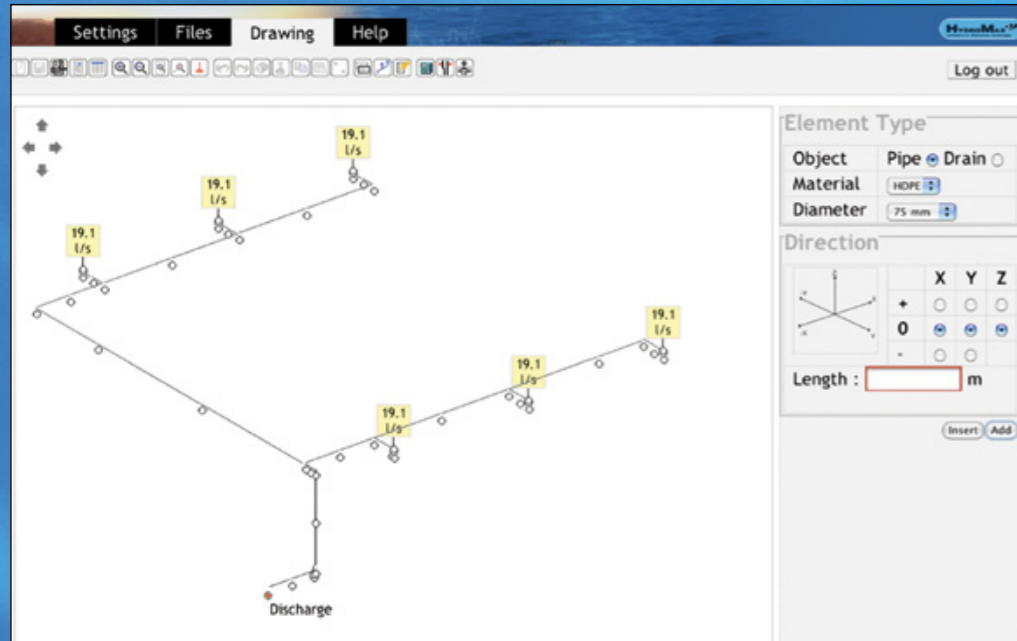
Terrain Fuze pipes are manufactured in the UK to BS EN 1519-1:2000 and BBA certification. Fully welded to withstand negative pressures, they offer excellent performance and durability with high weather and corrosion resistance.

With a wide range of diameters and fittings for maximum design flexibility, they are lightweight with electro-weld joints for rapid and simple installation.

Pipe Configuration

One of the major benefits of a siphonic system is that horizontal pipe runs do not have to be installed with a gradient, minimising the space required to accommodate the system. This provides the designer with freedom to route the pipes to any location at high level, before dropping to ground level.

HydroTechnic™ Design software & technical support



Pressure Calculation Results	
Out of Balance	Current 0.911 m
Minimum Pressure	-6.671 m
Maximum Pressure	1.152 m
Minimum Velocity	1.839 m/s
Maximum Velocity	2.734 m/s
Minimum Vertical Velocity	7.485 m/s
Maximum Vertical Velocity	2.734 m/s
Discharge Velocity	52 seconds
Fill time	PASS
Pass/Fail?	
Tail Pressures	1 -0.531 m
	2 -0.586 m
	3 -0.912 m
	4 -0.008 m
	5 -0.001 m
	6 -0.018 m

The highly accurate and sophisticated hydraulic calculation software rapidly calculates the pressures and velocities for full compliance with BS 8490:2007 for a cost effective and technically advanced solution to draining all buildings.



Design assistance

The Polypipe Gulf technical support service can provide design assistance for any project on receipt of the following details:

- Design rainfall rate
- AutoCAD drawings of roof floor plans, both sectional and elevation and drawings (preferably in CAD)
- Gutter profiles
- Performance specification – we can work with you to provide a specification

Technical Support

Polypipe Gulf offers a complete technical advisory service for information, assistance and help with specification, scheduling and estimating- a full design and installation partnership that includes approved designers and installers. This is supported by CAD drawings of products and applications, design and manufacture of prefabricated pipework and rail systems, installation drawings and in house advice and problem solving.

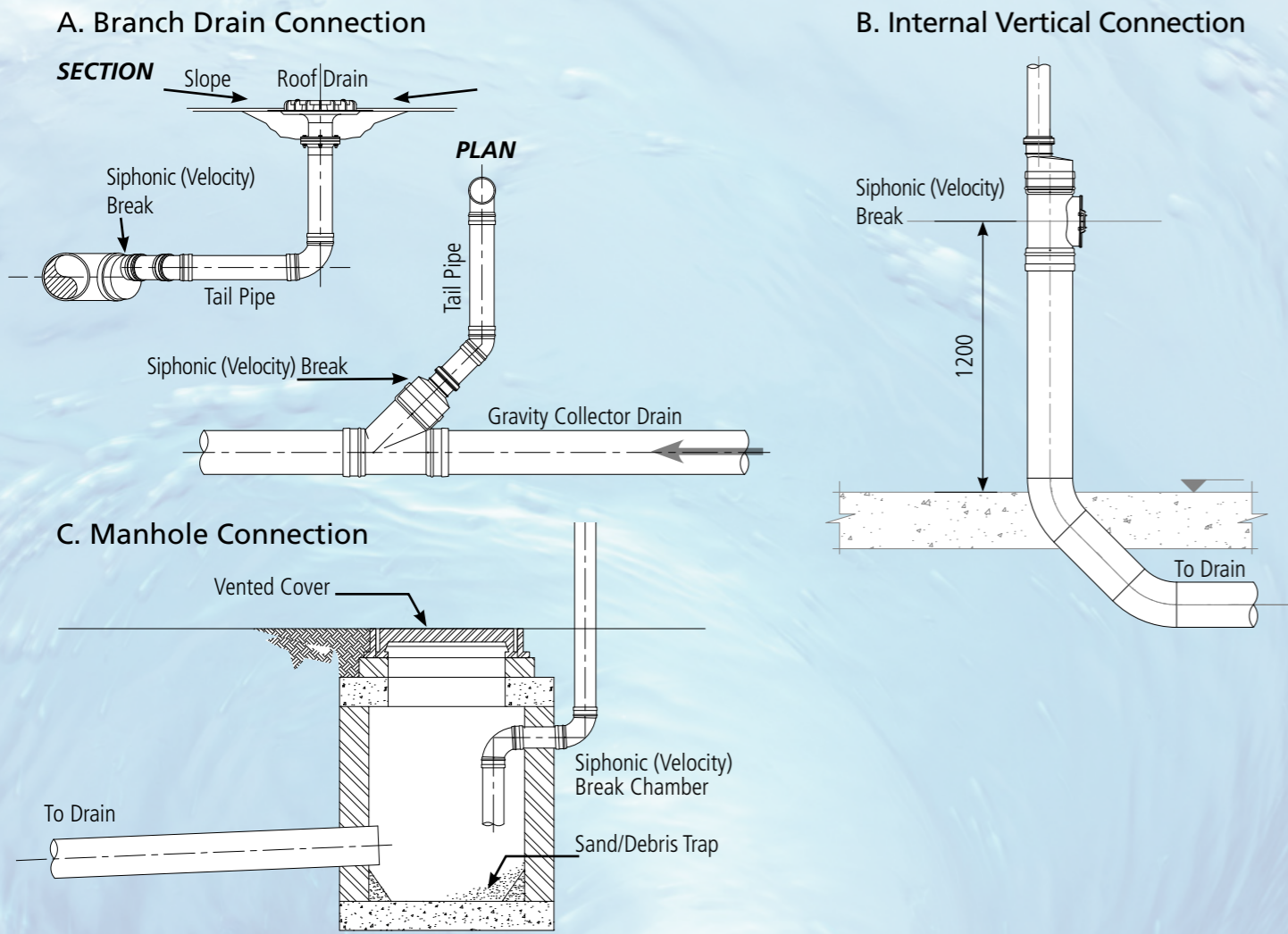


Failure to install pipework exactly as designed will be detrimental to the siphonic action. The Terrian Hydromax siphonic rainwater system will be installed by trained and approved installers to ensure that the pipework is installed exactly as designed. Any change to the proposed pipe routing or to the calculated design can be checked and confirmed quickly to prevent any delay to the installation.

A Proven Cost Effective Alternative to Traditional Drainage

Polypipe Gulf utilise an extensive resource of technical experts to provide the ultimate and cost effective installed solution for major developments across the Middle East and welcome the opportunity to demonstrate an alternative approach that can actually prove less costly and more effective than traditional methods.

System Break Connections



The point at which the Terrain Hydromax full bore siphonic rainwater system connects to the conventional gravity system is known as the siphonic (velocity) break.

It is an integral part of the design, the receiving pipe should be adequately sized to accept

- Flow from Siphonic Downpipe (l/s)
- System flow velocity (m/s)

The above sketches detail typical siphonic break requirements :

- Roof drain with tail pipe branch connection
- Internal vertical connection
- Manhole connection

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