

Traditionally we have allowed surface water to be drained as quickly as possible in to our underground drainage infrastructure. With the advent of increased urbanisation and changes to our climate we are now seeing more rainfall events that lead to significant flooding in urban areas as the underground system is unable to cope with peak demand.

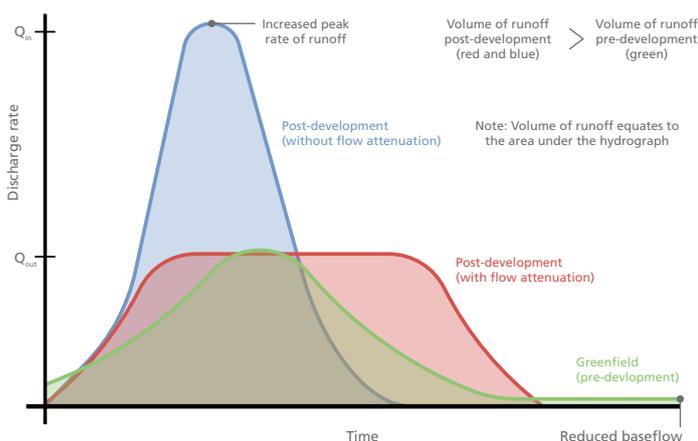
As a result of this, Local Authorities now have to prepare strategic flood risk assessments to complement their local plans to catch surface water run off close to where it falls and mimic natural drainage systems as closely as possible. In addition all new building developments have to have an outfall surface water flow rate prescribed to them by the Environment Agency.

The Polypipe Permavoid Rainwater Interception System can be used to control surface water at source and can be integrated into a wider SuDS strategy. Part of this system is the control of captured surface water back into the underground drainage system.

Following Water Management Solutions Technical Bulletin 4 where we introduced the Terrain Flow Control Outlet device, Technical Bulletin 6 elaborates further on how this device can be used to regulate flow rates into the underground drainage infrastructure. In Issue 4 we explained how the outlet worked, published flow rate tables and set out generic installation principles. In this bulletin we explain the application further and explore how the outlet and the wider Polypipe Permavoid Rainwater Interception system can be installed together.



Run-off hydrograph



Source Control

When used in conjunction with the Polypipe Permavoid Rainwater Interception system, water can be captured and attenuated at source at both podium and roof level of a building, with the flow control outlet allowing drainage of the attenuated volume at a controlled rate into the underground drainage system.

Source control is important as one element of an overall SuDS strategy for built environments, particularly cities. The diagram on the left explains the difference between a traditional approach to surface water management and coherent integrated SuDS approach to the management of surface water. The storm event peak is what, in particularly intense or prolonged rainwater events, has caused an increase in flood events in built up areas of the UK. This peak is exacerbated due to climate change and increased urbanisation with some peak events exceeding the capacity of our installed underground drainage systems.

By engineering our approach we can significantly reduce the effect of a peak storm event by removing the transient peak and managing the volume of water that the peak represents. As source control is at the very start of this event, we are actively storing and controlling the water that causes this peak to occur downstream thus reducing the risk of flooding. At the same time, engineers must consider removal of pollutants at source and how to combine source control with the need for increased urban green space, amenity and the promotion of bio-diversity. The target is to accommodate the run off from developments up to a 1 in 100yr rainfall event plus prescribed climate change addition.

Terrain Flow Control Outlet



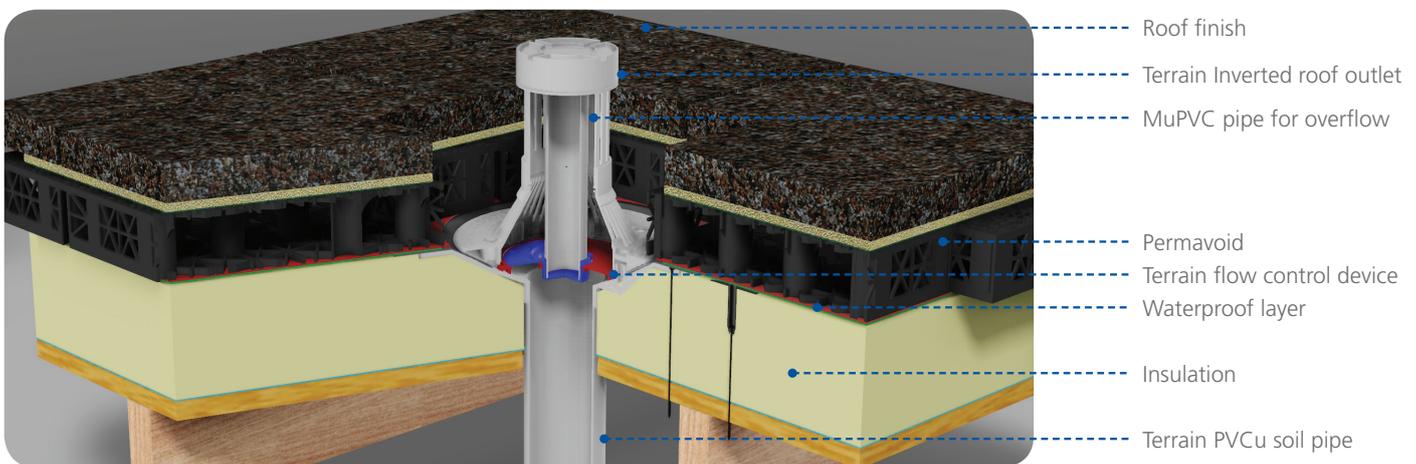
Roof and podiums are ideal catchment areas for source control that require unique engineered solutions. The Polypipe Permavoid system affords a shallow surface based water management system that can intercept rainfall at source providing storage and attenuation

utilising rainwater flow control outlets to control rainwater flow rates into the underground drainage system.

The patented Terrain Flow Control Outlet incorporates a rotating orifice plate which provides eight different orifice cross sectional areas, each of which allow a different volume level of flow control up to 5.5l/s. Once the orifice has been adjusted to its flow rate position it can be fixed in place to secure the cross sectional area. There is a 50mm vent opening at the centre of the orifice plate which can be opened up to insert a section of 2" PVC-u waste pipe that is cut to be above the water line of the outlet to provide overflow relief and venting for the gravity rainwater system. The outlet range includes flat, domed and inverted roof outlets in to which the flow control device is fitted.

Having introduced the Terrain Flow Control Outlet in a previous bulletin we have now demonstrated how it can be used in a Permavoid attenuation system to control surface water at source as part of a wider SuDS strategy. These strategies shall become more prevalent in the future as we continue to build and our climate changes further.

Our system approach demonstrates how Polypipe can assist architects, developers, designers and installers in meeting current and future challenges with respect to surface water run-off.



Polypipe Terrain flow control device installed within an inverted roof outlet.



Contact Us

to find out about our Technical Workshop

Look out for
the next Polypipe
Terrain Water
Management Solutions
Technical Bulletin
coming soon