



British Precast Drainage Association

Publications from the British Precast Drainage Association (BPDA):

BPDA was formed in 2017 from the integration of the Concrete Pipeline Systems Association (CPSA) and the Box Culvert Association (BCA).

Information published by both CPSA and BCA will be rebranded and replaced as BPDA in due course. New material will be branded BPDA.

All CPSA and BCA web traffic will be redirected to the new BPDA web site at www.precastdrainage.co.uk

FPMcCann precast concrete culverts enable innovative surface water drainage solution at Wakefield and District Housing development.

A series of shallow-section precast concrete culverts have been installed beneath the highways of Wakefield and District Housing's Hawthorn Court development. The culverts store rainwater run-off while allowing the surface water drainage system to connect to an existing storm water drain with a high invert level.

The development of 32 timber-framed two- and three-bedroom houses and a single bungalow has been constructed on the site of a former residential home. It was designed by consultant NPS and built by the housing association's in-house construction team.

The surface water drainage solution was developed by structural and civil engineering consultant Dudleys to meet the planners' requirement for surface water drainage to be capable of dealing with rainfall from a 1-in-100 year storm, with an additional 30% capacity to allow for an increased rainfall resulting from climate change.

A maximum surface water run-off rate of 7l/s from the site to the sewer was agreed with Wakefield MDC and Yorkshire Water which meant the scheme had to be designed to incorporate 159m² of storage.

There was insufficient space on the site for a detention pond or other surface-based water storage on the site so an innovative underground storage system was developed for the run-off. Because the level of the existing surface water sewer (the invert level) into which the development had to drain was exceptionally high, Dudleys developed a solution based on a series of interconnected shallow precast concrete culverts situated beneath the development's access roads. The culverts' shallow profile kept the system above the invert level of the existing sewer so that the development could drain naturally. "We had to keep all surface water drainage as high and as shallow as possible," says Andy Walker, a director at consultant Dudleys.

The rate at which surface water flows from the development to the sewer is restricted using a vortex flow-regulator. This self-activated flow control device induces a vortex motion into the drainage flow to keep the flow of water leaving the site below the design maximum of 7l/s with any excess flow backing-up into the series of storage culverts.

The culverts have been constructed from precast concrete sections manufactured by CPSA member FP McCann. Three of the culverts are formed from 1500 x 600 precast concrete sections while a fourth culvert and a highway drain are formed from 1500 x 800 sections. "Because the installation is so shallow on this site we really had to use the strength provided by a concrete drainage solution because we wouldn't have been able to achieve sufficient volume of storage beneath the highway using a plastic system," Walker explains.

The scheme was completed in October 2015, at which time its access roads were adopted by the council while the surface water storage solution was adopted by Yorkshire Water. "Installing the storage in council land was important to ensure long-term maintenance access to the culverts," Walker explains. The precast concrete units had sufficient strength to enable the culverts to be located beneath the highways and to ensure the storage system would be adopted by Yorkshire Water. "We had to work very closely with FP McCann to make sure the solution meet the adoption criteria," says Walker.

