urbanwatercycle

PROJECT PART-FINANCED BY THE EUROPEAN UNION

Purification and flow control

The aims of the purification pilots

The reintroduction of water into Bradford City Centre is a bold step and there will be many critics if things go wrong. Therefore it is essential that decision makers can be confident that things will go right, otherwise they will be much less ambitious in their aspirations. The purification pilots are designed to demonstrate how wetlands and low footprint vortex separators can provide water of sufficient quality for the urban stream and how low maintenance controls can be designed to maintain the flow. As well as this, the pilots will also provide valuable information about the quality of water in Bradford Beck which will provide the water for the stream course. However, the purification pilots are not just about the technical aspects. By building two wetlands within local communities, the City Council can "test the water" to see what contributions they can make to the local environment and social cohesion through education of local children and the involvement of the community in their management. If the pilots are successful in this aspect, then the opportunity arises to introduce wetlands (or village ponds) throughout the district. To many, this is just if not more important than the scientific knowledge and technical experience gained from the pilots.

The wetlands

Two wetlands were constructed on tributaries of Bradford Beck, one downstream of a combined sewer overflow whose operation was reduced by the construction of in system storage. The other was downstream of the outlet from a surface water sewer system. Thus the wet weather impacts of the different drainage systems could be investigated. The wetlands were constructed adjacent to the watercourses and controlled amounts of flow were abstracted, treated and returned to the river. Flow control devices were fitted so that retention times could vary between twelve hours and two days, and the wetlands were isolated from runoff from the surrounding land by filter drains, minimising the impact of external factors. The first two ponds were for settlement and sedimentation purposes and were concrete lined to facilitate cleaning. Reeds were planted in the bottom two ponds to facilitate the purification process. Sampling and testing programmes were devised for wet and dry weather and for different retention times for a range of water quality parameters including bacteriological ones. The sampling programmes were funded by the RDF grant and other UK research projects and these will continue beyond the end of the UWC project. As well as the sampling an active community engagement programme has been developed involving the management of the wetlands and surrounding areas and the use of the wetlands for educational purposes. This involves activities such as pond dipping for younger children and more complex work for adolescents.

The vortex separators

The vortex separators were tested at the inlet to the Bradford Beck diversion tunnel close to the city centre. The inlet provided a secure compound for the separators and the pipe work associated with the testing. Normally located below ground, the two separators were constructed on the concrete at the side of Bradford Beck. Flows were pumped from the Beck to a header tank and a system of valves controlled the flow through the separator. Flow was measured by means of a V notch weir. Samples could be drawn off from the system upstream and downstream of the separators and also taken from inside. A sampling and testing programme was devised to determine the performance of the separators at very low flow rates.

Initial results

The initial results and operational experience gained are providing valuable information. The wetlands can produce water to a quality equal to the Bathing Water Guideline standards during dry weather in summer, but performance deteriorates in wet weather and in winter. The vortex separators are effective at removing sediment and the simple low flow control systems that are required can be operated for prolonged periods without blockage or the need for excessive maintenance.