

# Chapel-en-le-Frith WwTW Upgrade

## tertiary stage ensures quality receiving waters for game fish

by  
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**C**hapel-en-le-Frith WwTW, situated in the Derbyshire Peak District, serves a population equivalent of 6,000 and is capable of treating a daily flow of up to 5.1 Ml/d. In order to comply with environmental requirements of the EU Freshwater Fish Directive and river water Quality Objectives for the receiving watercourse - Black Brook, a tributary of the River Goyt, improvements were required to meet effluent discharge quality consent requirements set by Environment Agency at 15mg/l BOD and 2 mg/l ammonia. These improvements involved de-nitrification of the treated wastewater.



Upgrade works at Chapel-en-le-Frith (courtesy ????)

The existing works which comprises conventional biological trickling filters, followed by humus settlement tanks, was unable to meet the new consent standard. Following a feasibility study, a decision was made by *United Utilities* to add a tertiary treatment stage to the existing process.

A joint venture comprising of *OTVB Ltd* and *Norwest Holst Construction* was appointed by *Montgomery Watson Harza*, on behalf of *United Utilities* to design and construct a tertiary Biological Aerated Flooded Filter (BAFF) using the *OTVB Biostyr* process. A new feed pump station, situated along the route of the existing outfall and incorporating an emergency bypass was constructed to lift the effluent to the new flow splitting chamber before being divided amongst the three *Biostyr*® cells.

Each of the three cells consists of upflow filtration through a fine, floating granular media, retained by a nozzle slab. Bacteria form a film on the *Biostyrene*® media, which break down the pollutants into cellular material which is retained within the bed. The media also acts simultaneously as a filter to remove solid particles. Air is injected into the base of each cell to provide the necessary environment for nitrification to occur.

Each cell is periodically backwashed to remove trapped solids and excess biological growth, using the head of water stored above each cell. This eliminates the need for separate clean backwash storage and the pumping facilities required in conventional BAFF plants.

A dirty washwater tank was constructed to contain and balance the backwash flows prior to their return to the head of the existing treatment process. A particular feature of the Chapel-en-le-Frith works is that the influent frequently contains insufficient amounts of alkalinity to support the autotrophic bacteria necessary to achieve nitrification. Storage and dosing facilities for lime were therefore introduced into the scheme to artificially raise the level of alkalinity to the required levels.

Chapel-en-le-Frith also incorporates a maturation system which allows potential post wash spikes of BOD and TSS to be ameliorated.

Construction of the new process plant began in late April 2002 with the M & E installation beginning in August 2002. The *Biostyr*® began receiving its first flows in early November 2002, from which point on the process was rapidly established with the aid of temporary ammonia dosing to accelerate formation of the biomass. Process performance trials were successfully completed on 18th January 2003, some ten weeks ahead of the required compliance date.

**This £2 million upgrade of Chapel-en-le-Frith Wastewater Treatment Works ensures that the receiving water is of a quality that supports a variety of game fish. ■**

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