

# Ballater WTW

## Serving Scottish Tourism

by  
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**S**cottish Water's £3.7m Approved Capital Investment Programme to upgrade their existing water treatment works at Ballater is designed at serving not just the local community, but the influx of tourists to the area in the summer, when river levels are at their lowest. The catchment population swells from circa 6,000pe to 10,000pe at the height of the tourist season, which has previously resulted in the Ballater supply having to be augmented by tanker supplies. The plant is designed to a maximum 12,000pe, around 1.8 megalitres a day. The raw water is being extracted from the River Gairns, a tributary of the Dee, which as a rain-fed spate river, is subject to wide variations in quality and flow.



Approach to site

Courtesy of Enpure Ltd

### Existing Process

Raw water is abstracted by gravity from the River Gairn (max 1400m<sup>3</sup>/day) and from three Springs which are located close to the Works. The water gravitates to a raw water settlement tank where coarse solids settle. Settled water goes forward for filtration through four slow sand filters, operated in parallel.

Filtered water flows to the Chlorine contact tank where disinfection is carried out using Electro-Chlorination, and then onto the reservoir.

### New Process

A small log weir has been constructed at the inlet to the works, and additional flow monitoring installed, to aid proper control of river water extraction. A brand new 350m<sup>2</sup> treatment building has been erected to house all the new treatment equipment to allow the works to be constructed and commissioned before switching into supply.

Based on analysis of the options for improving water quality, particularly with regard to colour, it has been decided to replace the four existing sand filters with three continuously operating Dynasand filter units from Hydro International. The wash water from the filters will be fed to two lamella clarifiers, with a significant proportion of the supernatant returned to the works inlet. The sludge from the clarifier will be passed through a thickener, with its supernatant being returned to the river after filtration through the existing slow sand filters, and the thickened sludge being stored in a tank, for removal by road tanker.

The filters will be fed with water from a new set of inlet pumps. These, and the existing treated water pumps, will be fed by VSDs to enable the filter units to be operated with optimised flow rates.

Additional chemical treatment systems are to be installed. Polymer is to be fed into the wash water system to aid clarification. Prior to

the new filters Sulphuric Acid is being used to control pH, and aluminium sulphate for coagulation purposes. A standby generator is to be provided to increase security of supply. The plant is due for completion in Oct 2009.

### DynaSand Filters

Ballater WTW is a contact filtration plant consisting of 3 off DS5000 continuous DynaSand filter cleaning pH corrected and alum flocculated water for a potable water supply. The washwater from the filters is treated by 2 off LS25-25-05 lamella separators which settle the solids generated before discharging a clean supernatant.

The DynaSand filter is an up-flow continuously backwashed filter, whereby a small proportion of the filter flow is used to clean the sand on a continuous basis eliminating the need for separate backwash tanks and pumps, and no requirement for redundancy in the units.

The sand bed is continuously cleaned whilst the filter is in operation by the use of an air lift pump which raised the sand from the bottom to the top of the filter, where the sand falls through the washer whilst the capture suspended matter is released and flows away with the washwater.

The lamella separator is then used to clean the washwater making the supernatant suitable for discharge or reuse. The lamella is a very compact technology occupying significantly less space than a conventional settlement process, which works by allowing the particles to settle over much smaller distances than they would normally have to if treated by a convention technology.

**Note: The Editor & Publishers thank Charles Watt, Project Manager with Enpure Limited and Paul Barter, Principal Process Engineer of Hydro International for providing the above article.■**



*Dynasand filters and Lamella clarifiers before the erection of the new building*

*Courtesy of Enpure Ltd*